THE JOURNAL OF LAND & PUBLIC UTILITY ECONOMICS

ON THE WAR-TIME ECONOMY

War and Soil Conservation
Arthur C. Bunce

Grand Coulee and Bonneville Power in the National War Effort
Vernon M. Murray

Farm Real Estate Market in War Time
M. M. Regan

Federal Housing and World War II
Ruth G. Weintraub and Rosalind Tough

War-Time Adjustments in Farm Tenure
Rainer Schickele

Also

Department Articles *and* Book Reviews

including

Review of *The Economics of Total War* (Henry W. Spiegel)
by James T. Earley

VOLUME XVIII, NUMBER 2 MAY, 1942 PRICE $1.50 A COPY

THE JOURNAL OF LAND & PUBLIC UTILITY ECONOMICS

CONTENTS — MAY, 1942

DEPARTMENTS

PUBLISHED QUARTERLY BY THE UNIVERSITY OF WISCONSIN
DURING THE MONTHS OF FEBRUARY, MAY, AUGUST, AND NOVEMBER

Publication offices:
Sterling Hall, University of Wisconsin, Madison, Wisconsin
and
730 West Monroe Street, Chicago, Illinois

The contents of the *Journal* are indexed in the *Industrial Arts Index.*

Entered as second-class matter, January 3, 1938, at the post-office at Madison, Wis., under the Act of March 3, 1879. Additional entry at Chicago, Illinois. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized October 12, 1922. Printed in the United States of America.

Subscription Rates: $5 a year; $1.50 a copy. Remittances may be made by personal checks, drafts, post-office or express money orders payable to the Journal of Land & Public Utility Economics.

Agents of the *Journal* in Great Britain, B. F. Stevens & Brown, Ltd., 28-30 Little Russell St., British Museum, London, W. C. 1.

THE JOURNAL OF LAND & PUBLIC UTILITY ECONOMICS

Founded by RICHARD T. ELY

Published by The University of Wisconsin

THE JOURNAL OF
LAND & PUBLIC UTILITY
ECONOMICS

MAY
1942

VOLUME XVIII
NUMBER 2

War and Soil Conservation

By ARTHUR C. BUNCE*

Prices and Production in a War Economy

IN a war economy the prices of many products do not reflect consumers' demands, as may be seen in the case of a multitude of military goods such as guns, airplanes, vitamin tablets and many more. Military experts direct production into various channels on the basis of the efficiency of each product in defeating the enemy: this is the supreme social end existing at that time.

Changes in prices have little to do with the directions of production. If we want more tanks, we plan their production in physical terms and alternatives—more tanks and fewer battleships or farm machinery or motor cars. We do not simply advance the price of tanks and depend upon the normal business responses of individual firms to produce more.

This change is of vital importance to agriculture now because food is in the same category as materiel when it is used to help the Allies. Farm production of food and essential raw materials can no longer be purely a matter of response to market prices but must also be planned in terms of the use of physical resources.

The difficulty of planning agricultural production compared to industrial planning lies in the large numbers of small competing firms with a relatively fixed production plant. The difficulty of establishing reasonable prices lies in the great variations in costs and rural living standards. A further complication arises from the large consumers' demand that impinges on the market and affects prices: there is no consumers' demand for guns, and the government and the firm determine prices. In industry a conflict between consumers' demands for cars, refrigerators, and so on, is solved by rationing materials and reducing the supply of consumers' goods. This action has to be followed by consumer rationing and price controls, by taxes, or by other measures that will prevent inflation resulting from a reduction of the supply in relation to the demand.

* Assistant Professor of Agricultural Economics, Iowa State College. The Economic Research Division of the Soil Conservation Service is cooperating with the Iowa Agricultural Experiment Station in the research work upon which this paper is based but is in no way responsible for the opinions expressed here.

Because of the difficulty of differentiating between consumers' goods and defense goods in agricultural production; because the raw materials of agriculture (land, labor and capital) cannot be specifically allocated to the production of defense or consumer goods; and because defense needs are purchased on the open market in competition with consumers' demands, production in agriculture must largely be directed through flexible prices with a system of voluntary or economically induced cooperation between farmers and government agencies. Thus develops the complex problem of whether agricultural production can be stimulated sufficiently to provide a supply large enough to meet both defense and consumers' needs without undue increases in prices. Such a problem must be solved by taxation or rationing and price control, or a mixture of both.

Our major concern here is the use of flexible prices and cooperative production planning to increase output and the relationship of this increase (and the means used to attain it) to disinvestment or exploitation of our soil resources in the war and post-war periods.

The Time Period

Plans to maximize physical production can be made only if the time period is stated. In agriculture, the price offered must anticipate the future supply response by at least one growing season in order to avoid rather violent fluctuations in production and price. If, for example, the requirements of soybean oil are expected to be trebled by the fall of 1942, the market price in the fall of 1941 and spring of 1942 may be left to competitive conditions at the time, but the price to be offered in the fall of 1942 should be guaranteed in the spring at a level that will probably increase production to the necessary output. This guarantee serves as a floor below which prices will not be allowed to drop, and it is essentially a means of spreading the production risk over the whole population rather than a small part.

In responding to such a guarantee, the farmer needs to know the minimum prices he can expect and the probable duration of the time of maximum production. If the expected period is short, he may maximize production by depleting his soil resources (exploitation of fertility) or, if the period is longer, production plans may be maximized by maintaining or even increasing the fertility. A 5-year period does not now seem to be too long for production plans if we consider the necessity of building up stores of food for post-war use in Europe.

Contrasted to this relatively short-run period, conservation planning of production considers long-time permanent production, and hence may conflict directly with war-time planning. Where this conflict occurs, the war economy objectives must always take precedence, because the values we are fighting to preserve are more vital than the resources used up to achieve victory. In this case, present emergency production becomes all important. It is not implied that there must arise a conflict between conservation planning and war planning, or that the aims of conservation must be abandoned. The degree of conflict will depend upon the type of products needed and the methods used to obtain the increase. In many areas a conservation plan will increase production over a 5-year period as well as stabilize it over the indefinite future.

From the point of view of conservation, we must consider the effect of increases in erosion-inducing crops, like soybeans and corn, and support those means of increasing production that will

cause the least permanent damage to our soil resources. Increases in roughages may well be associated with increased conservation and a larger production of milk, beef, and sheep.

Emergency Conservation

Conservation policy during an emergency appears to be different from a permanent policy in two major respects. It must consider a shorter time period, and it must consider adjustments that may be necessary after the emergency. The objectives can be stated as directing the use of land resources so that production over the period is maximized, and selecting, from alternative means of increasing production, those which will minimize the destruction of our land assets during and after the war.

If we assume a 5-year period and the need for a considerable increase in erosive or depleting crops, conservation plans should delineate the areas where increases may take place with the least capital loss over the period being considered.[1] Similarly, increases in hay and pasture should be encouraged in areas where they are most needed for conservation.

This applies not only to regional differences, however, but also to fields within farms. The basic distinction to be made is the difference between soils where only fertility depletion occurs, causing no permanent loss, and soils where depletion and erosion occur under intensive cultivation. In Iowa this distinction between depletion and deterioration was made by the State Subcommittee on Conservation. Similar distinctions may be made in all states; and the areas where fertility depletion causes no permanent damage to the land should be treated differently from the areas of soil deterioration or erosion. Similarly, the land areas of a farm might also be divided into these two major classes and differential treatment developed.

Government Policy for Areas of Soil Depletion

The areas where only depletion has to be considered, we will call class A land; the areas of soil deterioration, class B. The objective of emergency planning for class A land would be to assist the farmer to maximize his production and income over the period of the emergency through the most efficient use of his land. No restriction on intertilled crops and no payments for soil-building crops or practices would be necessary. In these areas the production of the desired crops can be maximized by using differential guaranteed prices and payments for specific practices which increase productivity.

If we consider a 5-year emergency period calling for increased production, many farmers with class A lands might increase their income over this period by shortening their rotations to include more corn or soybeans; and instead of a 3-year corn, oats, sweet clover rotation, this might be changed to a 2-year corn, oats and sweet clover, or to a 3-year corn, soybeans, oats and sweet clover rotation. Yields might be maintained or increased by the use of larger amounts of fertilizer. Even though the fertility is actually reduced over the period, it can be restored again after the emergency is over; and so long as the more exploitive system does not reduce yields during the emergency so as to lower the total output of the high-priced commodities, this system will maximize the farmers' income over the 5-year period. It is because of this

[1] For an analysis of this problem see U. S. D. A. Bureau of Agricultural Economics, *Farming Adjustments in the Corn Belt and Lake States to Meet Defense Needs and Post War Problems.* Mim., Milwaukee, Wis. November, 1941.

fact that the major incentive to increased production would be a guaranteed price over the current crop year. Instead of benefit payments some means of preventing increasing returns from leading to inflated land values (such as special taxes or deferred commodity payments) may be desirable. To the extent that farmers on class A lands can increase their income by increasing their production of intertilled crops in response to a withdrawal of government control over acreages, the less the need for increases in prices and increases in production of these crops on class B land.

Government Policy for Areas of Soil Deterioration

Class B lands will include various degrees of erodibility, and the response of the farmer to increased prices cannot be depended upon to produce the maximum increases over a 5-year emergency period.

This is true for several reasons: Increases in the production of non-erosive crops such as hay and pasture may involve considerable expense during the first year, while acreages of erosive crops can be increased with little cash outlay and many farmers make production plans covering only one year. In estimating the most profitable combination for their farms, many farmers do not make any allowance for disinvestment or the destruction of their soil capital due to erosion. In the majority of cases increases in intertilled crops should take place only if certain conservation practices such as terracing, contouring and strip cropping are adopted, and these practices often involve cash outlays. In order to make use of increases in roughage production more roughage-consuming livestock may be necessary, and this again calls for a capital outlay or a reduction of current income by holding back some of the livestock which would otherwise be sold.

As a result of these factors, a withdrawal of government control over acreages in these areas of soil deterioration might simply result in an increased production of intertilled crops and a decline in the production of roughages because the former could be achieved at little increase in costs when disinvestment in land resources is not taken into account. This increase in erosive crops is undesirable for two major reasons: (1) It may result in a relative under-production of roughage crops and roughage-consuming animals and their products: (2) When the cost of disinvestment and the associated costs of post-war adjustment are considered, the social net returns may prove to be less than they would be from an intensified non-exploitive system.

To some extent, the dangers of withdrawing government control over the acreages of intertilled crops might be reduced by using price controls to increase the returns from roughage crops compared to the returns from exploitive crops. The disadvantage is that this destroys the function of our flexible price system, which determines the comparative advantage of alternative uses of land in response to demand and the physical environment. At the same time, the price differential might have to be so high, to overcome inertia and encourage investment, that the prices of animal products would be greatly advanced, and the areas which could produce intertilled crops might swing towards the production of roughages.

When we consider institutional factors, like tenure conditions and capital rationing, even large price differentials might have little effect in achieving the most economic use of land on the areas of soil subject to erosion or deterioration.

Because of these limitations, government price policies should be limited to guaranteeing minimum prices over the current crop year, and these prices should be adjusted so that they reflect expected market conditions. Under these circumstances a withdrawal of government acreage controls on class B lands might easily result in destroying or disturbing the conservation systems already established on many farms. In order to prevent this (and also to assist the further development of conservation plans), government policies in addition to price guarantees are needed to maximize net returns from class B lands.

Government controls over the use of these lands may take many forms including a limitation of property rights, various kinds of subsidies and tenure legislation. Limiting property rights through zoning ordinances and land use regulations are appropriate means for preventing the development of serious maladjustments in the future; but they may be used, however, only to designate broad classifications of land use such as grazing areas, forest areas, and agricultural areas. They can do little in an emergency to stimulate increased production on farm lands. Where subsidies or land-use regulations are used, they must meet two basic requirements in an emergency: They must result in the production increases required during the emergency period and, at the same time, eliminate the socially uneconomic exploitation of the soil resources. In other words, they must be based upon positive control over erosion and increases in production and not upon the control over acreages of specific crops based on historical criteria. Under these circumstances benefit payments should emphasize such practices as terracing, contour farming, strip cropping, field reorganizing, liming and fertilizing, improving hay and pasture lands through renovation, and adapting the crops grown to the physical resources of the soil. Payments might also be made for improved livestock production through better sanitation, feeding of balanced rations, and the use of good stock.

Because these class B lands are subject to erosion, the acreages of erosive crops such as corn and soybeans must be related to the conservation practices adopted. Since payments for keeping such acreages below a stipulated figure may not be associated with any improved production methods, acreages of these crops might be controlled by deducting penalty payments for excessive plantings. For class B lands the permissible acreages of intertilled crops would have to be related to the use of erosion control practices such as terracing, contouring, and strip cropping.

In order to do this, class B land should be broken down into classes corresponding to the degree of erodibility. The most erosive class would be suitable only for hay and pasture. The other classes would represent land suited to cultivation with the acreages of intertilled crops related to both the erosiveness of the soil and the erosion control practices used. For any given area of such lands, alternative bases of earning payments and deducting penalties could be related to the conditions affecting the operator's ability to maximize his income. One farmer might wish to use all possible conservation practices and have as large an acreage of corn and soybeans as possible and to raise hogs and poultry; another might use no conservation practices and grow little corn or soybeans and raise beef cattle. The size of the farm would be an important factor in determining which alternative the farmer would choose; on smaller farms the much more intensive system would

probably be adopted while on larger farms a more extensive system may be desirable.

Apart from subsidies, social action to give security of occupancy is extremely desirable because security increases the ability of the operator to invest in both land improvements and livestock. This consideration is important when larger amounts of roughage are required and an exploitive corn-hog system offers immediate increase in income with much less risk for a tenant with an annual lease.

Some Practical Problems

When we turn from generalizations regarding class A and class B lands to the problem of developing action programs suited to individual farms which include both classes of soil, certain practical problems must be solved.

If the farmer is to maximize his income from class A lands by growing any quantity of intertilled crops that seem most profitable to him over the emergency period, no general soil depleting acreage can be established for the farm as a whole. Similarly for class B lands, various alternatives for the farm may be available; which is the most desirable depends upon the operator's ability and preference, the conditions of his occupancy, and the size of the farm. That flexibility is desirable is generally recognized; but many objections are raised because the necessary conditions of payment and planning are too complex and indefinite.

The Soil Conservation Service has been developing individual farm plans based upon detailed conservation surveys and, in the soil conservation districts, much of the planning is now done by the farmers themselves in group meetings led by conservation technicians. One of the major difficulties, however, is to make the detailed conservation surveys and prepare the land-use capability maps as rapidly as the area incorporated in districts expands. During an emergency, higher prices may encourage an expansion of erosive crops, *and the need for more rapid planning becomes urgent.* Essentially our great need is for the type of individual farm planning that has been developed by the Soil Conservation Service with a simplified land classification that would enable trained township committeemen to cooperate with the farmer to help him develop a production program and conservation plan for his farm, and earn payments that would be related to his attainment of a suitable plan. Such a simplified classification would have to be developed for various areas and regions. The following system might prove feasible in the corn belt; but adjustments for local conditions such as soil types and special local problems would have to be made.

A Simplified Classification

Any simple classification of land for the purpose of avoiding an increase in erosion that may result from an increase in intertilled crops must be based upon a factor that is easily observed by the farmers without detailed technical assistance. Such a classification will be of necessity less accurate than one that is more complete and takes into account more variables. The erodibility of soils under a given cropping system depends upon several factors. Soil type, degree of past erosion, steepness of slope and the length of slope all play important parts in any given area of similar climatic conditions. The justification of using a simplified classification is that in an emergency it may be more useful than one which cannot be applied rapidly.

An analysis of over ten thousand planimeter readings taken from detailed con-

TABLE I.* DISTRIBUTION OF CASES BY EROSION AND SLOPE CLASSES FOR SIX AREAS

Slope Class / Erosion Class		A				B				BB				C				D			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Area	No. of Cases																				
Knoxville	1951	125				220	411	21	49	18	196	179	116	4	77	81	231	1	50	40	132
Greenfield	2639	265	2			380	201	202	187	22	137	492	346	5	11	68	208	1	5	9	98
Bethany	2394	373	5			250	431	176	72	27	207	247	190	16	53	82	211	1	16	14	23
Shenandoah	1661	273	18	7	2	153	138	121	99	18	125	398	273		2	11	19				4
Marion	1372	563	26	3		353	199	42	10	38	61	42	8	3	7	6	5	1	4		1
Farmersburg	804	32	1			178	107	20	1	84	142	99	25	5	36	39	34				1
All	10821	1631	52	10	2	1534	1487	582	418	207	868	1457	958	33	186	287	708	4	75	63	259

* The planimeter readings and tables used in this article were prepared by the W.P.A. Statistical project in Des Moines in cooperation with the Iowa Agricultural Experiment Station.

servation survey maps in Iowa (with a few from Missouri) indicates that slope is closely related to the degree of erosion. Table I shows the distribution of the cases in four erosion classes according to slope classes and Table II gives the average erosion for each slope class. The six areas all reveal the fact that as the slope increases the erosion rating also increases. Table III is based upon the same material as tabulated in Table I but the major soil types were kept separate and only the average erosion and total cases in each slope class are shown. This Table reveals three basic facts: (1) erosion is closely related to slope; (2) erosion on different soils, in the same slope class may vary considerably; and (3) erosion on the same soil type in the same slope class may vary between areas. This third variation may be due to differences in mapping crews in the various areas or to differences in climate or the historical use to which the land has been put. From these figures, however, it appears reasonable to state that in any area of relatively similar soil types the erodibility of the land will largely be determined by its slope. This suggests that a simple criterion for classifying land according to its erodibility within a given area of similar climate and associated soil types would be the percentage of slope. This characteristic has the further advantage of being easily determined without specialized scientific training. Using slope as the single criterion of erodibility, we could group corn belt agricultural land into the following tentative classes:

Class 1. Nearly level land (under three percent slope). Subject to slight or no erosion. Land use and practices to

TABLE II.* AVERAGE EROSION BY SLOPE CLASSES FOR SIX AREAS

Slope Class	A	B	BB	C	D
Area	Average Erosion				
Knoxville	.50	1.35	2.27	2.87	2.85
Greenfield	.51	1.70	2.67	3.14	3.31
Bethany	.51	1.58	2.39	2.83	2.60
Shenandoah	.63	1.82	2.35	3.00	3.50
Marion	.55	1.01	1.63	2.12	1.67
Farmersburg	.55	.99	1.69	2.39	3.5
All	.55	1.47	2.41	2.88	2.94

* Calculated from Table I.

be determined by the farmer in relationship to other physical factors and prices. This would correspond to the areas of fertility depletion previously referred to as class A land.

Class 2. Slightly sloping land (three to eight percent slope). Without conservation prac-

TABLE III. DISTRIBUTION OF CASES AND THE AVERAGE EROSION BY SLOPE CLASSES FOR MAJOR SOIL TYPES FOR SIX AREAS

Soil Type	Area	Slope Class	A	B	BB	C	D	Total Cases
Carrington fine sandy loam	Marion	cases	7	79	24	3	2	115
		av. erosion	.93	1.39	1.83	1.17	1.5	
Carrington loam	Marion	cases	61	213	58	2	1	335
		av. erosion	.70	1.12	1.71	2.0	1.5	
Carrington silt loam	Marion	cases	152	253	47			452
		av. erosion	.53	.84	1.54			
Clayton silt loam	Farmersburg	cases		56	109	48		213
		av. erosion		1.48	1.85	2.46		
Clinton silt loam	Knoxville	cases	2	118	64	23	2	209
		av. erosion	.5	1.48	2.19	2.37	2.5	
Grundy silt loam	Bethany	cases	68	364	34			466
		av. erosion	.53	1.29	2.00			
Grundy silt loam (yellow subsoil)	Bethany	cases	1	172	85			258
		av. erosion	.5	1.91	2.05			
Lindley loam	Bethany	cases		31	69	110	27	237
		av. erosion		2.73	2.78	2.95	2.65	
Marshall silt loam	Shenandoah	cases	60	478	544	4		1086
		av. erosion	1.13	1.81	2.61	3.0		
Muscatine silt loam		cases	17	110	28	1		156
		av. erosion	.5	1.01	1.61	1.5		
Shelby loam	Bethany	cases		83	305	199	17	604
		av. erosion		2.73	2.83	3.13	2.97	
Shelby loam	Greenfield	cases	4	211	651	277	104	1247
		av. erosion	.5	2.98	2.89	3.20	3.36	
Shelby loam	Knoxville	cases		31	172	162	75	440
		av. erosion		2.89	2.63	3.01	3.09	
Shelby silt loam	Bethany	cases	1	141	162	35	2	341
		av. erosion	.5	1.55	1.69	1.47	1.5	
Shelby silt loam	Greenfield	cases		36	128	8	6	178
		av. erosion		2.25	2.34	1.75	2.67	
Shelby silt loam	Shenandoah	cases		18	204	19	3	244
		av. erosion		2.72	2.63	2.87	3.50	
Tama silt loam	Farmersburg	cases	10	144	187	46	1	388
		av. erosion	.6	1.06	1.50	2.20	3.5	
Tama silt loam	Greenfield	cases	39	412	206	6	3	666
		av. erosion	.55	1.91	2.17	2.20	2.83	
Tama silt loam	Knoxville	cases	10	308	170	11		499
		av. erosion	.50	1.42	2.01	2.50		
Union silt loam	Knoxville	cases		9	30	137	123	299
		av. erosion		2.50	2.80	2.96	2.75	
							Total cases tabulated..	8433*

* This total differs from that in Table I because soils with less than 100 occurrences have been omitted.

tices, not more than 25 percent to be planted in intertilled crops in any one year; with contouring, 33-1/3 percent may be in such crops; and with terraces and strip cropping, 50 percent may be intertilled crops.

Class 3. Rolling land (eight to twelve percent slope). With no conservation practices, not more than 20 percent to be in intertilled crops each year; with contouring, 25 percent may be in such crops; and with terraces and strip crops, 33-1/3 percent may be in intertilled crops.

Class 4. Steeply sloping land (over twelve percent slope). Not suitable for cultivated crops but may be used for permanent hay or pasture with cultivation limited to that necessary to establish new seedings.

These four classes would vary between areas and should be related to broad soil groups and climatic conditions. This simplified classification is only suitable for areas where topography is the controlling factor in determining erodibility, and for other areas different factors will have to be used.

Similarly, the rotations and suitable conservation practices would have to be varied by areas and would be established by the state agronomy and soils specialists in cooperation with Soil Conservation Service technicians. The number and size of areas within each state having different slope classes and land use recommendations would of course be determined by the heterogeneity of the resources involved.

The advantage of using as simple a classification as possible during an emergency lies in the fact that the farm planning may be greatly facilitated. Class 1 land may be used any way the farm operator thinks most profitable and no acreage allotments or penalties need apply. Class 4 land could be kept in permanent cover and payments earned only for liming, fertilizing and re-seeding, or forest practices, with deductions from the total farm payments made for each acre cultivated except for re-seeding purposes. This leaves only class 2 and 3 land which need be considered in detail by the committeemen and for which alternative payments for various degrees of conservation practices could be established; various permissive acreages of intertilled crops could be chosen by the farmer by selecting the conservation and production plan most suited to his labor supply and size of farm.

Payments and Penalties

By adopting all necessary conservation practices, a farmer could earn payments for several conservation measures, and at the same time he might have 50 percent of class 2 land and 33-1/3 percent of his class 3 land in intertilled crops. Only as he exceeded those maximum figures would he be penalized for excess plantings of such crops. On the other hand, if no conservation practices were adopted, the farmer could earn no conservation payments on the land and would be subject to deductions for acreages of intertilled crops in excess of 25 percent for class 2 land and 20 percent for class 3 land.

Under any such plan the conservation payments and deductions would apply to the farm unit as a whole so that, where necessary, deductions for excess acreages of intertilled crops on one piece of land could be made from conservation and other payments made on the same farm unit. Other payments that might be in-

cluded would be those for disease control, scientific feeding methods, field reorganization requiring the moving of fences, and the planting of trees and shrubs in forest and game areas.

One of the major problems that would inevitably arise would be that of allocating optional land use programs on fields that contained land of more than one class and which should be used differently. The fact that we have a square survey applied to a curved landscape has resulted in many rectangular fields containing, in some cases, all four classes of land. In many cases a sound land use program cannot be applied to the present rectangular field layout. Simply to subdivide the present fields would result in areas too small to be worked efficiently with modern machinery, especially if farmed on the contour. Field reorganization could be encouraged in two ways: by direct payment for such reorganization based upon the rods of fencing that had to be rebuilt in order to make a conservation land use plan possible; or the classification of mixed fields can be arranged so that the permitted acreage of intertilled crops is reduced if the fields are not rearranged.

A simple classification might state that where a field contains two or more classes of land, the permissible intertilled acreage could be obtained by classifying the whole field as one class lower if more than 30 percent of the total area falls into lower classes. Then conservation payments could be earned on the whole field, and no deductions for excessive acreages of intertilled crops would be made so long as these acreages remained within the limits of that set by the lower class. Where the farmer desires to farm the land more intensively in respect to intertilled crops, he must either accept deductions for excessive acreages or separate the poorer land and treat it differently.

Thus a 100-acre mixed field with 60 percent of the land class 1, 20 percent class 2, and 20 percent class 3 would be classed as 100 acres of class 2 land, and the intertilled acres would be limited to 25 acres without penalties. If the land were contoured, the allowance would be increased to 33 acres; and if terraced and strip cropped where needed, the intertilled acreage would be raised to 50 acres. If the field were broken up to a 60-acre class 1 field and a 40-acre mixed field, the farmer could put all the 60 acres into corn or soybeans or use any rotation he desired. The 40-acre field would then become class 3. If the farmer wanted to maximize his production of corn without penalty payments, he could split the 40 acres into two fields with 20 acres of class 2 and 20 acres of class 3 land and apply all the suitable conservation practices.

Skills and Action

In developing a broad conservation program of this nature, the various action agencies will need to cooperate closely with each contributing the special skills and techniques they have developed. While these conservation plans may not be so complete as those being developed within conservation districts, they would be very much more widespread. At the same time the allocation of conservation payments within the districts might speed up the introduction of more complete plans. It is a question of evaluating an intensive procedure against an extensive one in the allocation of personnel.

We must also maintain contacts with all farmers in order to obtain forecasts of planting intentions so that price guarantees may be closely associated with probable supply and demand conditions. We also need to maintain contacts which

will be useful in making any adjustments in production that may be called for in the post-war period.

Why Changes Are Needed

The justification of a more extensive approach to conservation during a period of emergency lies in the fact that it permits increases in production in response to prices, and hence may avoid the danger of too high prices due to a production lag, and the danger of inflation that this implies. It directs the increased production of intertilled crops to the lands that will not be permanently damaged by excessive cropping during the emergency. It also encourages the farmer to maximize his income on erosive soils according to his preference, his size of farm, and the degree of erodibility of the land involved. In an emergency, it is essential that each farmer use his skills of production to the fullest extent, but such use can only be achieved when there is flexibility in the farm plan.

Conservation does not imply any narrow land use. There are usually several alternatives possible, and the presentation of alternative conservation possibilities will impress upon the farmer the fact that erosion is a basic consideration in farm planning. Finally, the plan presented here involves the use of funds to increase efficiency and achieve or maintain an appropriate land use pattern which is flexible within limits and which will reduce erosion rather than increase it during the emergency. A further consideration that can only be mentioned here is the fact that funds will tend to flow to the areas of poorer soils where the lack of capital may be a serious obstacle to the improvement and intensification of both primary and secondary production. To the extent that this is true, an increased allocation of funds to these areas may permanently raise the level of living of the rural population.

Post-War Adjustments

One of the greatest advantages of developing these flexible individual farm plans is that the three basic factors of soil, operator, and prices are brought together and given consideration and form a logical basis for adjustments that may be needed after the emergency is ended. What these adjustments will be, will depend upon the post-war organization of Europe and the world, particularly with respect to tariffs and agricultural policies.

If interdependence, exchange of goods, and a rationalization of European agriculture are accepted, we may again be exporters of grains, cotton and lard with part of the European grain areas turning to the production of dairy products, fresh meats and fruits. If economic nationalism again dominates the peoples of Europe, we may face the necessity of curtailing our production of these products. Some adjustments both in Europe and in this country are inevitable, and the procedure outlined above will give us a better basis for making more satisfactory adjustment in that any necessary crop controls can be related to the physical resources involved. This program will permanently eliminate the present conflict between conservation and production control that exists in the present AAA program. Any expansion of depleting crops on a percentage or historical basis is unsound from a conservation point of view because it is not related to the physical resources, and any percentage reduction of specific crops as a means of adjusting production fails to take into account the relative importance of that crop to the balance of the farm as a whole and its relationship to commercial production. Because it is necessary to harmonize production ad-

TABLE IV. AVERAGE FEED UNIT PRODUCTION PER 100 ACRES OF FARM LAND FOR FARMS WITH SCS AGREEMENTS AND OTHERS*

Area	Tenure	Number of farms		Feed units per 100 acres					
				Concentrate		Roughage		Total	
		SCS	Other	SCS	Other	SCS	Other	SCS	Other
Shenandoah	Owners	35	22	2,266	2,274	1,374	1,237	3,640	3,511
	Tenants	21	25	2,569	2,329	1,242	1,153	3,811	3,482
	Both	56	47	2,379	2,303	1,325	1,192	3,704	3,495
Bethany	Owners	29	22	644	852	1,449	1,273	2,093	2,125
	Tenants	11	13	677	738	1,316	818	1,993	1,556
	Both	40	35	653	810	1,412	1,104	2,065	1,914

* Unpublished data obtained from farm record books kept by farmers. These farm account routes were established under a cooperative agreement between the Soil Conservation Service the Iowa Extension Service and the Agricultural Experiment Station. The sample was stratified to obtain comparable farms in all groups. The significance of differences between averages has not yet been tested statistically.

justments and conservation during the emergency, we may develop the basis for a sounder adjustment program in the future. The production adjustment program might include acreage payments for the production of new commercial crops, the ever-normal granary, and price guarantees over one crop year supported by loans. Conservation payments could then continue to be made for positive conservation action or, as may become desirable, for actual land improvements.

It would be unsound to develop conservation plans in areas where maladjustments between farm population and land exist unless these basic maladjustments are remedied. In many areas we need a recombination of the factors of production and shifts in the intensive and extensive margins. The adjustment may be made by increasing capital or land inputs relative to farm labor; secondary production may be intensified where labor is not fully employed; or farm size may be increased with a less intensive primary production. To the extent that war demands create alternative employment for farm labor, the necessary adjustments in farm size may be facilitated; and where this consolidation of farm units occurs, the changes should be considered permanent and some method of preventing further maladjustments from developing should be adopted. The postwar pressure of unemployed labor upon the land may be great or slight depending upon our ability to maintain a high level of industrial employment. It is relatively easy to intensify agricultural production but exceedingly difficult to re-

TABLE V. AVERAGE ANIMAL UNIT PRODUCTION PER 100 ACRES OF FARM LAND FOR FARMS WITH SCS AGREEMENTS AND OTHERS*

Area	Tenure	Number of farms		Animal units per 100 acres					
				Conc. Cons.		Rough. Cons.		Total	
		SCS	Other	SCS	Other	SCS	Other	SCS	Other
Shenandoah	Owners	35	22	9.88	9.22	18.19	17.00	28.07	26.22
	Tenants	21	25	9.71	6.67	17.00	15.46	26.71	22.13
	Both	56	47	9.82	7.86	17.74	16.18	27.56	24.04
Bethany	Owners	29	22	3.70	4.79	16.02	16.58	19.72	21.37
	Tenants	11	13	3.23	3.21	14.98	10.72	18.21	13.93
	Both	40	35	3.57	4.20	15.74	14.40	19.31	18.60

* Cf. footnote, Table IV. Figures in both these tables are preliminary.

verse the process. Methods of meeting this post-war problem should be developed now and might take the form of land use regulations, zoning ordinances or public ownership. While the more permanent changes need to be considered, the most urgent problem at present is to devise methods of expanding our intertilled crops with a minimum of destruction of our soil resources *and then put the plans into action.*

While this necessary expansion of intertilled crops is taking place the production of hay and pasture should also be increased by improved practices and the use of lime and fertilizer in order to maintain a balance between roughage and concentrate feeds. In some areas, improved roughage production may be a more effective method of increasing feed unit production than an expansion of the acreage of intertilled crops. The importance of this is clearly indicated by figures from a study conducted in southern Iowa and northern Missouri where erosion is a serious problem. Table IV shows the roughage and concentrate feed units per 100 acres of farm land produced on farms with agreements with the Soil Conservation Service and a comparable sample of farms without agreements in two areas. The conservation farms were producing more roughage and total feed units in both areas. In the Bethany area, the SCS farms were producing less concentrate feed units but many more roughage feed units. These figures again emphasize the importance of relating the crops produced to the quality of the resource involved. The striking difference in feeds unit production between the two areas is due to the fact that the Bethany area is much rougher and has poorer soils than the Shenandoah area.

Table V shows the roughage and concentrate animal units produced per 100 acres of farm land and in both areas more roughage-consuming and total animal units were being fed on the conservation farms. These figures clearly indicate the possibility of expanding the production of livestock in the more erosive areas of the corn belt through increasing roughage production without expanding the acreages of intertilled crops. The importance of tenure conditions is indicated by the fact that in both areas tenants were feeding fewer animal units, particularly roughage-consuming, than were owners. This difference in livestock production between owners and tenants has been observed in many studies and these figures emphasize the fact that, in the corn belt, insecurity of tenure is associated with a low production of roughage-consuming animals. This relationship is partly due to the larger production period required by roughage-consuming animals and creates an added pressure to produce more intertilled crops in those areas where insecurity of tenure exists. Measures designed to offset this institutional factor in order to increase production during the war period may, therefore, have permanent beneficial effects both upon production and soil conservation.

Grand Coulee and Bonneville Power in the National War Effort

By VERNON M. MURRAY *

At the request of the writer, this article has been revised and edited to conform to the requirements of the Emergency Committee on War Information. All specific information as to locations of present war industries and all data regarding industrial development in the area beyond the current year has been deleted.

THE transmission and sale of Grand Coulee and Bonneville power by the Bonneville Power Administration is now a major war industry. Over 80 per cent of all energy generated at these dams and sold by the Administration during the month of February, 1942, was furnished directly to private industries producing war materials. On the basis of present commitments, this value will rise to over 90 per cent by the end of the present calendar year.

TABLE I. DEMAND, ENERGY REQUIREMENTS, AND BILLINGS OF CUSTOMERS SERVED BY THE BONNEVILLE POWER ADMINISTRATION DURING THE MONTH OF FEBRUARY, 1942

Class of Consumer	Summation Monthly Demands KW	Monthly Energy Consumption KWH	Monthly Billing $
Public Agencies			
Public Utility Districts	8,513	5,012,580	$ 13,070
Municipalities	6,094	1,870,488	8,224
Cooperatives	934	284,498	1,395
	15,541	7,167,566	$ 22,689
Federal Agencies	804	325 820	1,417
Private Utilities	51,767	27,978,422	78,790
Industries	238,799	156,955,000	354,413
	306,911[a]	192,426,808[a]	$457,309

[a] Throughout this report the effect of interchange of power back and forth between the Administration and other generating agencies has been ignored except in the listing of actual "System Peak Demands" given in Table IV. Such interchange is, in general, on a one-to-one dump power basis and, except in the case of an emergency, makes little contribution to the system demand. At present interchange of power can be made with the cities of Seattle, Tacoma, Centralia, Ellensburg, McMinnville, Eugene, and Washington Water Power Co., Portland General Electric Co., Northwestern Electric Co., and Pacific Power & Light Co.

To appreciate how unexpected this development is, it is necessary to examine the text of the "Bonneville Act" (HR-7642) which governs the sale of Grand Coulee and Bonneville power.[1] Few people realize just how "pro public power" this Act really is. It specifically instructs the Bonneville Administrator in selling this power to give preference and priority at all times to public utility districts, counties, states, municipalities and cooperatives. After having set up the preferential rights of these public bodies, the Act frankly states "It is declared to be the policy of the Congress, as expressed in this Act, to preserve the said preferential status of the public bodies and cooperatives herein referred to . . ." It further defines the policy as one of allowing opportunity and time for any elections necessary to create *new* such bodies and "to take any action necessary to authorize the issuance of bonds

TABLE II. DEMAND AND ENERGY REQUIREMENTS OF PRIVATE INDUSTRIES SERVED BY THE BONNEVILLE POWER ADMINISTRATION DURING MONTH OF FEBRUARY, 1942

	Demand KW	KWH Per Month
Aluminum Co. of America	181,300	120 624,400
Reynolds Metals Company	44,539	28,848,400
Oregon Shipbuilding Co.	8.560	4.952 000
Pacific Carbide & Alloys Co.	2,000	1 272,200
Pennsylvania Salt Co.	2,400	1,258.000
Summation	238,799	156,955,000

* Manager, Mid-Columbia District, Bonneville Power Administration, Yakima, Washington.

[1] The Bonneville Act itself covers only the sale of power generated at Bonneville Dam, but the sale of Grand Coulee power is temporarily included under this Act by Presidential Executive Order No. 8526. August 26, 1940.

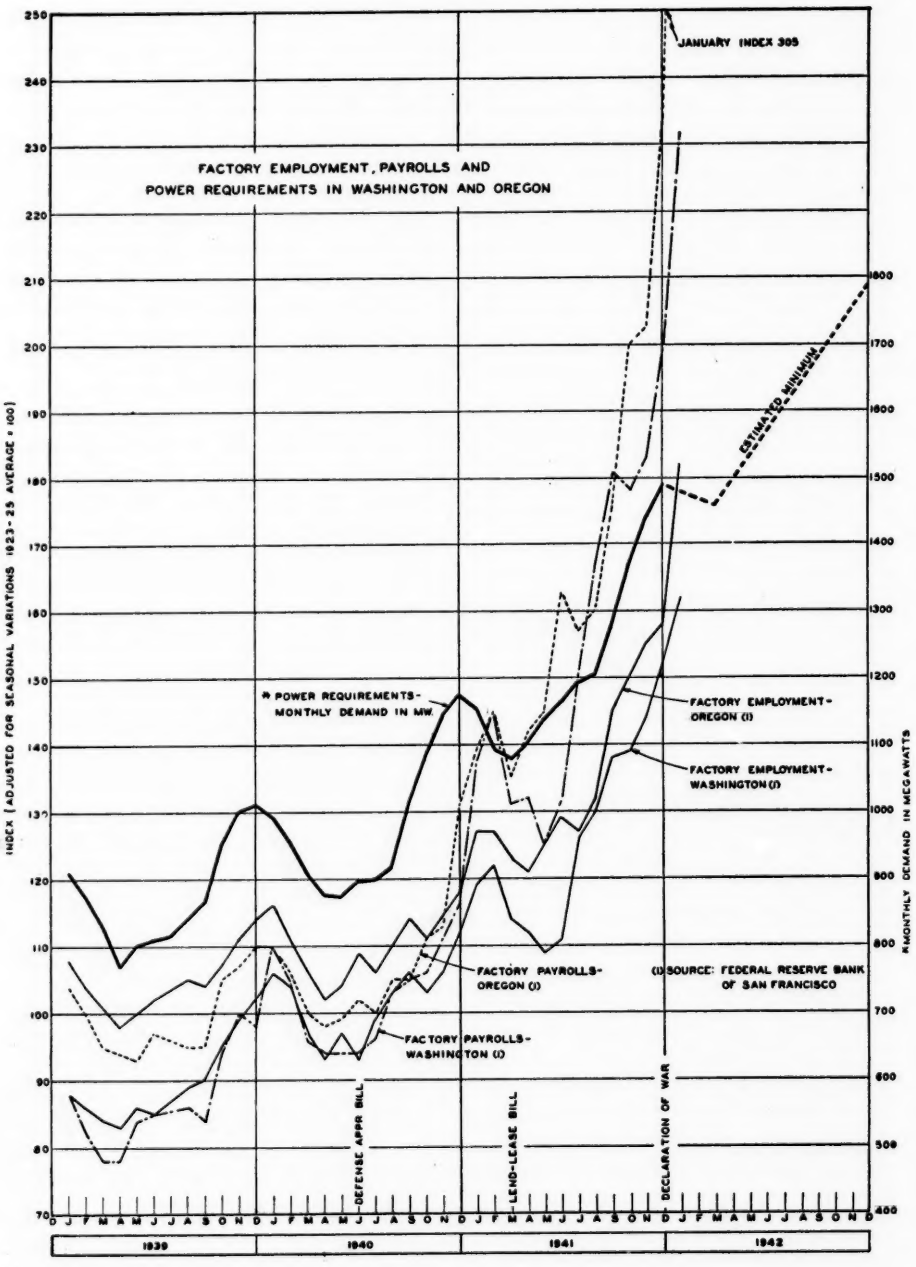
or to arrange other financing necessary to construct or acquire necessary and desirable electric facilities . . ." In selling such large blocks of power under this Act directly to industrial plants, it is evident that Administrator Paul J. Raver and Congress itself are, during the present emergency, using a very liberal interpretation of the Act. This, of course, must be done with the full knowledge and agreement of these preferred customers—the public bodies and cooperatives. Indeed, the spokesmen for these bodies claim that the electric users in these public utility districts, municipalities, and cooperatives are making a major contribution to the national war effort by foregoing their opportunity of receiving lower cost federal power through their proposed publicly-owned distribution systems.

It must be admitted that these representatives of the "public bodies" can present a convincing picture substantiating this claim. On January 1, 1941, the stage appeared to be set for the last act of the Pacific Northwest public power program. Both Bonneville and Grand Coulee dams were completed; generating facilities were either installed or under construction; the Bonneville Power Administration was a going concern instructed by Congress to give preference and priority to public power agencies; forty-four public utility districts had been formed in the states of Washington and Oregon for the distribution and sale of this power over publicly-owned facilities; thirty-one municipal utilities stood ready to purchase all or a portion of their power requirements from the Administration; forty-seven REA cooperatives had applied to the Administration for power; and negotiations for the system-wide purchase by these public bodies and the Bonneville Administration jointly, of four of the major private utilities in these two states were well under way. It is true that the war in Europe and Asia and the increasingly suspicious activities of Japan obscured the picture somewhat; and while it seemed certain that the future would bring many changes, yet it seemed equally certain that one of these changes would be the public ownership of all electric generating transmission and distribution facilities in the states of Washington and Oregon. On March 11, 1941, President Roosevelt signed the "Lend-Lease Bill" (HR-1776) and the picture changed almost over night.

Both the states of Washington and Oregon had, prior to this time, felt the effects of the national defense rearmament program initiated by the five billion dollar Defense Appropriation bill (HR-1055) which was signed in June, 1940. From June, 1940, to January, 1941, national defense contracts had been awarded in these two states to the value of $586,937,258. These values *do not include* the purchase of raw materials produced in the states but used elsewhere —such as aluminum, lead, mercury, timber, pulp, etc. Under the added impetus of the "Lend-Lease" program, the value of these contracts had by June, 1941, reached $944,222,330[2] and by September, 1941, were over $1,200,000,000. As shown in Figure 1, factory employment and payrolls soared to new highs and electric power production, which had always followed these two indicators rather closely, was forced to keep pace.

The task of furnishing the rapidly growing power requirements of the area fell largely to the Grand Coulee and Bonneville hydro plants. For years the private utilities and the privately-financed

[2] Sources: Bureau of Labor Statistics, Department of Labor Bulletins, and Office of Government Reports.


FACTORY EMPLOYMENT, PAYROLLS AND
POWER REQUIREMENTS IN WASHINGTON AND OREGON
JANUARY INDEX 305
ESTIMATED MINIMUM
* POWER REQUIREMENTS-
MONTHLY DEMAND IN MW.
FACTORY EMPLOYMENT-
OREGON (1)
FACTORY EMPLOYMENT-
WASHINGTON (1)
FACTORY PAYROLLS-
OREGON (1)
FACTORY PAYROLLS-
WASHINGTON (1)
(1) SOURCE: FEDERAL RESERVE BANK
OF SAN FRANCISCO
DEFENSE APPR BILL
LEND-LEASE BILL
DECLARATION OF WAR
INDEX (ADJUSTED FOR SEASONAL VARIATIONS 1923-25 AVERAGE = 100)
*MONTHLY DEMAND IN MEGAWATTS
1939
1940
1941
1942

municipalities had greatly curtailed expansion of their generating facilities; and even before the development of the national emergency dangers of power shortage had become apparent. Fortunately, as has already been pointed out, both Grand Coulee and Bonneville dams were constructed and some generating units installed by the time the all-out war effort was called for. Thus only the manufacture and installation of additional generating units, extensions to existing power houses, and construction of additional transmission facilities were necessary to make low-cost hydro power available to the service area in very large blocks. The time in which to accomplish these things need be no greater than that necessary to make more expensive steam generated power available from hastily constructed emergency fuel-burning plants. Furthermore, the Bonneville Power Administration had already filed with the National Resources Planning Board and the Bureau of the Budget a carefully planned "Six-Year Program" covering the installation of generating units at both dams and the construction of transmission and transformation facilities for the fiscal years 1942 to 1947, inclusive, to take care of the normal growth in the region's power needs. It was, therefore, only necessary to step up an existing program with which most of the interested parties were already familiar.

In determining the additional power requirements of the expanding industrial program, it must be borne in mind that the power available is hydro power and is particularly adapted for serving loads of high load factor. The Bonneville Administration's wholesale rate, for example, permits the purchase of 5,000 kilowatts at 45 per cent annual load factor at a rate of 4.4 mills per kilowatt-hour while this amount at 80 per cent load factor will cost only 2.5 mills per kilowatt-hour. The type of industries attracted to this area by such rates are the high current-consuming industries of the electro-thermal or electrolytic type. These industries produce the basic product for war materials and have far greater electric power requirements per dollar value of final product or per employee than do the fabricating type of industries. The large requirements of such industries are shown in Table III. The data shown apply to a new plant which came into full operation during 1941. This plant is capable of producing 78,000 tons of aluminum a year and in 1941 paid the Administration $2,364,593.70 for power, an average of 2.03 mills per kilowatt-hour.

During the present emergency when twenty-four hour operation of plants is necessary, fabricating plants also operate at high load factor. The rates of the Bonneville Power Administration are therefore attractive to this type of industry, but, of course, to a much less degree since the electric power requirements per dollar value of end product are much lower. A reference to Table II will show that the Oregon Shipbuilding Company during February operated at an average monthly load factor of over 85 per cent. During this month the Company paid $18,800 for power—an average

TABLE III. ACTUAL POWER AND ENERGY REQUIREMENTS OF AN ALUMINUM REDUCTION PLANT DURING THE 1941 CALENDAR YEAR

Month	Maximum 30-Minute Demand KW	Energy Consumption Total KWH
January	63,784	46,272,800
February	68,880	44,576,000
March	70,504	52,075,800
April	99,400	72,850,400
May	131,040	97,587,000
June	161,504	114,718,800
July	163,800	120,535,800
August	164,892	120,952,810
September	167,076	118,616,400
October	170,184	124,786,200
November	173,124	123,013,800
December	178,164	130,805,800
	Total	1,166,811,610

TABLE IV. INSTALLED GENERATING CAPACITY, MONTHLY PEAK DEMANDS, ENERGY CONSUMPTION, AND GROSS REVENUE OF THE BONNEVILLE POWER ADMINISTRATION

Month and Year	Installed Capacity KW	System Peak Demand KW	Energy Sold KWH	Gross Revenue [a]
June 1940	86,400	61,000	24 087,570	$ 54,108
July	86 400	63,000	34,850,831	79,923
August	86,400	91.000	37 682,820	86,032
September	86,400	90,000	41,005,495	94 209
October	86,400	89,000	49 070.851	110,065
November	86 400	86,000	37,478,063	87,422
December	140,400	115.000	59 307,336	131,745
January 1941	194,400	127,000	69,924,256	157 711
February	194,400	134,000	67 991.983	164,014
March	194 400	159,000	79,516.414	170,573
April	194,400	194,000	101 105.915	220.270
May	194,400	195,000	123,189,243	263 091
June	194,400	238,000[b]	144 119.234	309,229
July	214,400	239,000[b]	154 272,345	318,931
August	214,400	230,000[b]	157,365,483	332 208
September	268,400	274.000[b]	163.743,587	356,077
October	356,400	288,000	17?,690,809	366 456
November	356,400	325 000	178 397,896	397,900
December	356 400	341,000	194,923,948	430,623
January 1942	464,400	361,000	211 292.044	456,159
February	464,400	371,000	192,521,075	457 758

[a] Sales of electric energy only. Rentals excluded.
[b] Cities of Seattle, Eugene, Centralia and Washington Water Power Company furnishing supplemental power.

of 3.8 mills per kilowatt-hour. Had the load factor been only 30 per cent, the best rate the Administration could offer would average 5.9 mills per kilowatt-hour.

The estimated total load to be carried by the Administration by the end of the present calendar year is shown in Table V. These estimates are based on existing contracts and commitments already made.[3] The installed generating capacity available at Bonneville and Grand Coulee will at this time be only 626,400 kilowatts, and it will be necessary for the Administration to either purchase supplemental prime power from other sources or to rely upon the overload capacity of the installed units to carry the December, 1942 peak. This crucial situation in the latter part of 1942 will be relieved during 1943 at the end of which year the installed capacity at both plants will total 1,166,400 kilowatts, according to present schedules. However, the relief afforded by the expansion of capacity will be limited since additional loads are scheduled to absorb the additional capacity.

A comparison of Tables IV and V shows an anticipated growth in demand during 1942 of approximately 300,000 kilowatts. It will be noted that Figure 1 shows a total demand for both the states of Washington and Oregon of 1,490,000 kilowatts for December, 1941. Thus, based on the incremental load of the Administration only, it appears that the minimum power requirements of the area should reach approximately 1,800,000 kilowatts by the end of the current year, or almost double the 1939 peak demand for the two states.

TABLE V. ESTIMATED LOAD IN KILOWATTS SERVED BY BONNEVILLE POWER ADMINISTRATION BY DECEMBER, 1942

Public Agencies		28,000
Federal Agencies		25,000
Private Utilities		42,000
Industries:		
Electrometallurgical	458,500	
Chemical	43,000	
Fabricating	43,000	
		544,500
Total		639,500

[3] It does not appear to be in the public interest at this time to show load data beyond the present year.

At the present writing the net result of the present war emergency has been the advancement of the Bonneville Administration's program by at least two years. This includes the installation of generating facilities at both dams, the construction of transmission and transformation facilities, the loads served, and the revenues obtained from the sale of power. These revenues, which in 1940 were approximately $749,000, have advanced to $3,503,213 in 1941 and are expected to exceed $6,000,000 during 1942. Furthermore, all accumulated deficits of the initial construction periods have been wiped out, and the Administration has an earned surplus at the end of 1941, after providing for all operating expenses, depreciation and interest and amortization on the Government's investment.

The Farm Real Estate Market in War Time

By M. M. REGAN*

A VERY definite strengthening in values as well as in sales of farm properties characterized developments in the farm real estate market during the past 12 months.

Preliminary results of the annual land value survey conducted by the Bureau of Agricultural Economics indicate a rise in values of 7 percent for the country as a whole.[1] This rise brings the index of values to 91 percent of the 1912-14 average. The increase is the most substantial that has occurred since the World War I period, and is almost twice the size of the advances that occurred immediately following 1933. The rather sharp advance of the past year marks the end of a 5-year period in which values for the country as a whole were remarkably stable at about 85 percent of the pre-war average.

The rise in values was widespread with some advance reported for each of the 48 states. The most substantial increases were reported in the East North Central and East South Central groups of states, where values were up 11 percent and 10 percent respectively. The increase in the Mountain States averaged about 8 percent while in the West North Central, South Atlantic, West South Central, and Pacific Divisions increases of 6 percent were reported. As is usually the case, increases were more limited in the North Atlantic States, with a rise of 3 percent or less in both the Middle Atlantic and New England States.

The largest increase in any state occurred in Indiana, where a rise of 14 percent was reported. Increases almost as substantial were indicated for Illinois, Kentucky and Michigan, where values rose about 13 percent. Ten other states, including four in the Mountain region reported increases of from 9 to 11 percent.

In 10 of the 14 states reporting the most substantial increases, values were at or below their pre-war levels a year ago. In 2 of these states the increases the past year were sufficient to carry values beyond their pre-war levels. For the country as a whole, values now are still below pre-war averages in 27 states, as compared with 33 states a year ago.

The average increase during the past year for the states in which values were below their pre-war average was somewhat greater than for the states above. It is possible that the tendency for greater increases in the lower relative value areas will be more pronouncd during the immediately coming years. With the exception of the wheat areas, values are generally at relatively lower levels in the areas likely to be benefited most by the increased wartime demands for agricultural products. Such a development would counteract somewhat the tendency toward increasing value dispersion that has occurred as the base period becomes more remote and which has been more evident since the value upturn following the depression.

Factors in the Recent Situation

There would appear to be room for a considerable range in the degree of apprehension attributable to the increases that occurred during the past year. If

* Division of Land Economics, Bureau of Agricultural Economics, U. S. Department of Agriculture.

[1] *Farm Real Estate Values Show General Rise During Past Year.* United States Department of Agriculture, Bureau of Agricultural Economics, April 13, 1942. (Mimeographed, 3 pp.)

emphasis is placed on the depressed condition of the real estate market during most of the 30's, and recognition given the justification for some value increases resulting from admittedly temporary higher farm prices and incomes due to wartime demands, the increases are not alarming. From this view, the land value levels prevailing before the present war would be considered as below long-term expectations, and even without the war some rise in many of the principal farming areas would have been expected. In justification of such expectation, considerable stress is placed on the land holdings of corporate lending agencies as an influence that has been operating since the depression in the direction of curbing a more rapid response in land values to the improved price and income levels. For several years the extent of such holdings has been declining, although in recent years the rate of depletion has increased materially, and the influence of this factor on the land market is rapidly diminishing. In Iowa during 1941, insurance companies disposed of one-fourth, and the land bank one-third, of the acreage they had available for sale at the begining of the year. Inventories of farms for sale by insurance companies are less than one-half their peak levels and lower than at any time since 1933.[2] In Illinois, Indiana and Ohio, the holdings of corporate agencies are almost exhausted and can no longer be considered a significant factor. About the only extensive area where such holdings are still significant is in the extreme western Corn Belt, particularly in the Dakotas and Nebraska. In this area, the holdings appear sufficient to curb sharp value increases for another year or two. Once such holdings are depleted, more substantial value advances would be expected in order to call forth the necessary supply of farms.

From the viewpoint of long-term market influences, the depletion of corporate holdings is looked upon as an expected development. The influence of the improved wartime prices has been to shorten materially the period that otherwise might have been required for the market to absorb such holdings. In any case an eventual rise in values would have been expected, once absorption had occurred, and that part of the current value rise attributable to the removal of this influence would be considered warranted. Thus the removal of influences considered abnormally depressing, along with some rise because of the higher price levels expected to prevail for the duration, would appear sufficient to support the general increases that occurred during the past year.

If the increases that occurred are considered merely as forerunners for further value increases, there is cause for considerably more apprehension; and it is in such possibilities that current interest largely centers. The general consensus appears to be that values will increase further, although there is considerable difference of opinion as to their probable extent.

It is possible to develop an excellent case for the contention that value increases for the duration will be moderate, and that values are not likely to repeat their World War I performance. In supporting such a case, emphasis is placed on the significant differences between the land value situation now and that prevailing during the last war. These include changes in land and population ratio expectation, differences in attitudes growing out of land value movement experience, prospects for change in production techniques, degree

[2] William G. Murray, *Iowa Economist*, March, 1942, pp. 12-13.

of commercialization, purchasing power expectations for agricultural commodities, foreign trade prospects and others, most of which operate in the direction of cautious value responses to wartime prices.

In addition, the consequences of developments during and after the last war are considered sufficiently fresh in the memories of prospective participants in the market to make them unlikely to repeat past mistakes. A number of elements unfavorable to land value increases during the war period may also be cited. These include price ceilings for agricultural commodities, farm labor shortages and higher wages, inadequate supplies of machinery, equipment, fertilizer and transportation facilities due to priorities and allocations. Such factors, combined with higher general costs and increased income and other taxes, are expected to limit net income increases sufficiently to prevent a sharp rise in values.

While such a line of argument has considerable merit, the possibility of confusing what should happen from what may or even is likely to happen is apparent. It is one thing to point to the economic considerations that should control the value attitudes of buyers and sellers and quite another to foresee the possible current attitudes that may develop to stimulate activity into wide departures from the course considered proper from the viewpoint of the long-term economic considerations.

Thus, those who regard potential land value developments with apprehension place less faith in the possibility of changes in land value attitudes resulting from past experience. They are concerned with the increasing use of land investments as an inflation hedge and are dubious with respect to the effectiveness of farm commodity price controls and cost increases as land inflation curbs. The 110 percent of parity ceiling, for instance, allows for an increase in prices received by farmers in proportion to the increase in prices paid. Since the prices received apply essentially to gross income, and the prices paid largely to the deductions from gross income, conceivably the margin between income and expenses could increase at about the same rate as prices paid under such a price ceiling. Such margins may be curbed by increased income taxes, as well as rigidities in the indexes of prices paid, which may not fully reflect the prices of commodities actually available to farmers during the war period.

In addition, it is pointed out that farmers generally feel that land values are somewhat below the long-term levels that would be expected, even without the wartime influences and that the war warrants some further rise. Such circumstances are looked upon as providing the basis for initial land value increases and once they are generally observed, land value attitudes may undergo a material change, with excessive increases likely. Other elements operating in this direction include the supply of funds seeking investment in land, either in outright ownership or through mortgage credit. In addition, it is argued that the curbing influence of unwilling owner holdings will soon disappear. This combination of circumstances, together with increasing importance attached to post-war income security through government programs are looked upon as stimulants likely to cause further sharp land value increases.

Control Measure Proposals

The number who feel that direct price curbs are essential as a means of insuring against possible inflationary land value developments appears to be increasing.

In addition to those who are more apprehensive concerning likely market developments, this group includes those who feel that even though excessive value increases are not likely, the risk of such a possibility is sufficient to warrant taking some form of legislative action.

Proposals for legislation range from the milder forms of a capital gains tax on resales to a rather rigid permit system, in which a license or permit would be required to effectuate a farm transfer or a mortgage loan. Between these extremes are various types of gains or increment taxes, transfer taxes, credit rationing restrictions, moratoria on transfers and others.

Effectiveness and political and administrative feasibility appear to be the principal criteria upon which such proposals are likely to be evaluated. Undoubtedly some form of permit system could be made effective in curbing both speculation and excessive value upsurges. Whether the administration of such an approach could be simplified sufficiently or whether such a system would be politically acceptable is subject to greater question. Plans requiring appraisals as of a given date for price fixing or increment tax purposes, as well as any plan involving allocations or rationing would appear to be subject to certain of the same limitations.

Approaches through transfer or resale gains taxes would appear much simpler to administer, and possibly more acceptable. On the whole they may be considered as constituting more or less automatic adjustments in market decisions that would still be determined basically under competitive circumstances. Since the purpose of measures of this type should include curbing a general value upsurge as well, the extreme excesses associated with land market activity in a "boom" stage, the effectiveness of controls through taxes of the types indicated may be subject to some question. This is particularly the case in the resale gains type of tax, where a considerable increase in value levels would appear possible, even though a very substantial tax on gains through resale were in effect. Presumably a high tax of this type would practically eliminate participation by buyers whose intentions were primarily resale at a profit, while it would have little or no effect on buyers whose motives were primarily investment or purchase for operation. While the elimination of the so-called speculative incentives would have a curbing influence on value increases, the effect would likely be significant only in areas where the market was approaching a stage of spectacular activity. Before such a stage were reached, excessive increases over probable levels in the post war period could well occur. Such a tax would appear to have a mild restraining influence on general value increases, and provide an effective curb only where considerable resale activity is avoided that otherwise might have a significant influence on the market. The limitations indicated are merely a recognition of the special purpose nature of the resale gains tax. If the basic problem included that of retarding or curbing a general value upsurge, such a tax can be considered only as an auxiliary measure to prevent extreme developments from occurring, and as an effective supplement to other approaches directed more nearly at curbing the general value increases.

Since transfer taxes would be payable on first as well as subsequent transfers, and are likely to apply to more transfers, their possibilities for curbing a general value rise are probably greater than taxes on resales only. A basic objection to such taxes is that they are too broad. In contrast to the resale gains tax, where

the primary attack is on transfers involving speculative gains, transfer taxes go to the other extreme and discourage all types of transfers. Thus, if transfer taxes are high enough to have an effect, they will discourage purchases by tenants and operators fully as much as the purchases by investors and speculators. While the influence on general value levels is likely to be marked, in the sales consummated the buyer is still left with the burden of the tax. Short of a prohibitory tax, transfer taxes are not likely to be as effective on resale transfers as are the capital gains, which could go so far as to tax away all gains and yet allow for transfers.

Before the tax measures indicated are abandoned because of the limitations suggested, consideration should be given to the possibilities for removing the most objectionable features by adjustment or combination and thus develop an approach involving the use of the most advantageous features of each.

One such possibility would start with the use of a tax on transfers as high as 15 to 20 percent of the consideration. As a means of overcoming the objections cited earlier, a rebate, or exemption system could be used so as to allow for the differential treatment of different types or purposes of transfer. The net effect would approach a type of two-price system for agricultural land, although the basic price would be market determined. Once the rebate eligibility structure was established, the market could determine the allocation of farms. For example, if it were decided to discourage non-farmer investments in farms and encourage operator purchases, a difference in net cost to the buyer groups approaching the amount of the tax could be established. Such an arrangement would be expected to cause a substantial reduction in the non-farm demand for farms and thus curb general value increases.

In order to insure against speculative activities by those paying the transfer tax as well as those receiving rebates, a tax of the capital gains type would be an integral part of the approach.

Administration of a system involving such a rebate would admittedly involve complications not involved with the straight tax approaches. This would be the case particularly where direct rebates were not contemplated. The rebate could be effected through a government program financed by the transfer taxes. If considerable leeway were allowed for administrative determination of eligibles, the rebate system would resemble in part a permit arrangement.

A good many ramifications would need thorough investigation before a final evaluation of such a proposal could be made. Among them would be the types of transfers subject to tax, characterization and definition of rebate eligibles, the terms under which the taxes are to be collected, the treatment of eligibles whose status is changed shortly after purchase, as well as many others.

In connection with types of transfers subject to tax, supposedly those through inheritance might well be exempt. The case of foreclosures and assignments is more questionable. If applied in such instances, the tax would constitute a definite incentive for curbing mortgage loans, particularly junior liens. Loans standards would need to rest more on earning power than on security recovery value. The net effect of the application of the tax to foreclosures on the supply of mortgage credit would need to be weighted against the possible advantages of curbing a possible over-expansion in credit in the absence of such a curb.

Perhaps more important than any of the above would be the legal basis for such a proposal as well as a thorough evaluation of its value-curbing potential-

ities under conditions likely to exist in varying areas. Under peace times, the legal foundations would probably be the principal limiting consideration.

There is need for a careful review of these as well as other possible curbing devices. In view of the value increases reported, there would appear to be time for rather thorough evaluations of such measures. However, many will feel that none of the time available can be wasted, if greater land value stability is to be insured for the post-war period.

The United States Supreme Court Redeems Itself

By MARTIN G. GLAESER *

THE hopes of those who expected that the New Deal turn-over in the membership of the United States Supreme Court would also give us, sooner or later, a judicial new start in the problem of public utility regulation were ultimately realized. On March 16, 1942, the Supreme Court handed down its decision in the *Natural Gas Pipeline Company* case which was generally hailed by the press as marking the downfall of the 44-year old doctrine of "fair value" as embodied in the rate-making rule of *Smyth* v. *Ames*. On previous occasions it had seemed to those who were anxiously awaiting that oracle's valuation pronouncements that the time had come when the Court would do what Gerard Henderson had long ago called for when he wrote: "Fair value must be shelved among the great juristic myths of history, with the Law of Nature and the Social Contract. As a practical concept, from which practical conclusions can be drawn, it is valueless."[1] But the majority of the Court never quite took the decisive step. Because the acclaim with which this decision was greeted almost everywhere suggests that a new era in commission regulation of public utilities may have dawned, it is more than meet that the decision itself be soberly examined and its place in the trend of judicial opinion duly noted, before joining in the extravagant expectations which the opinion evoked.

The facts out of which the decision came may be briefly noted. Acting under powers conferred by the Natural Gas Act of 1938, and upon complaint of the Illinois Commerce Commission and on its own motion, the Federal Power Commission had issued an interim order reducing the wholesale rates which the Natural Gas Pipeline Company charged retail distributors in the Chicago area. The order was reviewed by the Circuit Court of Appeals (120 Fed. 2d 625) where the validity of the rate regulatory provisions of the Act was upheld but the specific order was vacated because the Commission should have included an amount of $8,500,000 for going concern value in the rate base and should have made more liberal provisions for amortization of the investment. Both the Company and Commission appealed the decision of the lower court.

The Supreme Court made short work of the Company's arguments assailing the constitutionality of the Act by finding them "without merit." Summarizing its views the Court said: "The price of gas distributed through pipelines for public consumption has been too long and consistently recognized as a proper subject of regulation under the Fourteenth Amendment to admit of doubts concerning the propriety of like regulation under the Fifth."

The Court likewise found, as a matter of statutory construction, that the interim order was valid and that the Commission need not draw up a schedule of specific reasonable rates of its own but might require the company to do so. In this connection it is interesting to observe that the Court notes with approval the orderly procedure whereby "the establishment of a rate for a regulated industry often involves two steps of different character, one of which may appro-

* Professor of Economics and Commerce, University of Wisconsin.

[1] Gerard Henderson, "Railway Valuation and the Courts", *Harvard Law Review*, Vol. 33, pp. 1031-51.

priately precede the other. The first is the adjustment of the general revenue level to the demands of a fair rturn. The second is the adjustment of a rate schedule conforming to that level so as to eliminate discriminations and unfairness from its details."

Coming now to the principal question involved in the appeal as to whether the revenue level is too low, the opinion considers the following main points: (1) the scope of judicial review of rates prescribed by the Commission; (2) going concern value; (3) the amortization base; (4) the amortization period; (5) the amortization interest rate; and (6) the fair rate of return. We shall review the Court's opinion upon these matters both from the point of view of their significance in the instant case and their importance in the development of the techniques of regulation.

Scope of Judicial Review

The Court begins consideration of the scope of judicial review by appealing to a juridical custom which implies that commissions in applying the statutory standard of reasonableness may range over a zone of reasonableness "within which the Commission is free to fix a rate varying in amount and higher than a confiscatory rate." The lower limit of this zone of reasonableness is marked by the "lowest reasonable rate" which the Court characterizes as "not confiscatory in the constitutional sense." It is significant that in this interpretation the Court relies, among others, upon the precedent set in recent cases arising out of the work of the California Railroad Commission, which is well known for its emphasis upon investment instead of reproduction costs, to wit: *Los Angeles Gas Co.* v. *Railroad Commission,* 289 U. S. 287, 305; *Railroad Commission* v. *Pacific Gas Co.,* 302 U. S. 388, 394, 395. The federal act regulating gas companies had provided in Section 5 (a) that the Federal Power Commission might order a decrease in rates where existing rates are "not the lowest reasonable rates." The Court drew from this the following conclusion: "It follows that the Congressional standard prescribed by the statute coincides with that of the Constitution, and that the courts are without authority under the statute to set aside as too low any 'reasonable rate' adopted by the Commission which is consistent with constitutional requirements." Thus the real import of the decision from the point of view of constitutional law is that, by accepting the device of the "zone of reasonableness", the Court has confirmed the self-denying position so often advocated by Mr. Justice Holmes, that the Court should not substitute its judgment as to the best public policy for that of the legislature or of its administrative agent, the Commission, particularly if that agent is one "informed by experience."

The following paragraph in the opinion confirms this interpretation. In its substance this paragraph refers to the entire course of judicial decisions from 1898, the date of *Smyth* v. *Ames,* to the present time. From this experience the Court, following also in the wake of the opinion of 1913 written by Mr. Justice Hughes, in the second Minnesota Rate Cases (230 U. S. 352) wrings the conclusion that constitutional legislation is a matter of setting economic limits for legislative experimentation, of preventing the abuse of discretion, and of proper versus improper investigation. The United States Supreme Court does not abdicate the position assigned to it by that astute and far-seeing student of institutional economics, Professor John R. Commons, when he assigned to it the unique status of the only *authoritative*

faculty of political economy in the world's history. I take it that in the paragraph quoted below the Court finally admits administrative commissions to significant partnership in the work of public utility regulation:

"The Constitution does not bind rate-making bodies to the service of any single formula or combination of formulas. Agencies to whom this legislative power has been delegated are free, within the ambit of their statutory authority, to make the pragmatic adjustments which may be called for by particular circumstances. Once a fair hearing has been given, proper findings made and other statutory requirements satisfied, the courts cannot intervene in the absence of a clear showing that the limits of due process have been overstepped. If the Commission's order, as applied to the facts before it and viewed in its entirety, produces no arbitrary result, our inquiry is at an end."

Going Concern Value

One of the hardy perennials of public utility rate-base theory has been the question whether the so-called intangible element of "going value" or "going concern value" shall be added to the so-called tangible elements in the rate-base. In a sense, going concern value has been the capstone of the entire structure of rate-base determination, because one's understanding of this elusive element gave tone and color to the entire procedure of reasonable rate determinations.

Going concern value was an issue in this case because the company insisted that $8,500,000 be added for this element to the rate-base upon which they are entitled to earn a fair rate of return. The Commission had reluctantly adopted as a rate-base estimates of replacement cost new of physical properties by the company's own witnesses. Also included therein were the value of gas reserves, estimated future capital additions up to December 31, 1942, and an allowance for working capital. The total sum was $74,420,424, all items representing liberal allowances, with replacement costs of the physical property in excess of the actual construction cost in 1931 and 1932 by upwards of $6,000,000. The company was willing to concede a deduction of $2,866,758 for "viewed depreciation" but the Commission used an undepreciated rate-base with the usual allowances for "overheads" in assembling the plant as that of a going concern.

Building upon the Circuit Court's finding that going concern value should have been included, the Company urged that expenditures incurred in the establishment and development of the business during the period from 1932 to 1939, prior to regulation, should be included in the rate base as an additional allowance. It should be noted that the claimed allowances were for expenditures to secure additional business, and for fixed charges (interest, taxes, depreciation, fixed expenses) on excess plant capacity. It was estimated that owing to depletion of gas reserves the property had a limited life for earning a return of 23 years. There was testimony that larger gas mains and facilities had been constructed in anticipation of business growth. In fact, however, only the first two years showed a book deficit, while the average annual return for the entire pre-regulation period was at the rate of 8 percent on the undepreciated investment. The Company had been able to pay average annual dividends of 33.6% on common capital stock issues of $3,500,000. The balance of the financial structure, consisting of $67,000,000 in bonds, had been decreased by one-fourth through bond retirements out of earnings. All actual expenditures for building up the business during the formative years had thus been properly brought to

book. Under these circumstances as to past financial history the Commission had declined to include going concern value as an additional item in the rate base.

After reviewing these facts of financial history, the Court significantly points out that the claimed additions to capital value would constitute "synthetic figures." It abruptly states and confirms the legal position maintained in recent cases that "there is no constitutional requirement that going concern value, when it is an appropriate element to be included in a rate case, must be separately stated and appraised as such." It does, however, introduce important qualifications that have economic significance. If the rate-base now includes what was once excess capacity, because at the time of installation such excess capacity was reasonably held for future use, the property has been treated as a "going concern." Thereupon the qualification is explicitly stated and it runs as follows: "When that has been done the burden rests on the regulated company to show that this item has neither been adequately covered in the rate base nor recouped from prior earnings of the business. *Des Moines Gas Co.* v. *Des Moines,* 283 U. S. 153, 166." It is submitted that this qualification is, in effect, a rephrasing of the well-known Brandeisian standard, that the investment must have been prudently made.

But what if, on account of excess capacity, the business, that is to say the earning capacity, can not be developed to yield a fair return over the entire service life of the plant? What if there is a long record of losses?

The answer to these questions is, it must be confessed, not as unequivocal as would be desirable for the future guidance of regulating authorities. Nevertheless, the constitutional aspect of the problem is fairly clear. It is again a problem of economic limits beyond which the court will not permit the constitutional doctrine of due process to be pushed. In any event, that is the present writer's interpretation of the following language in the opinion:

"It is only on the assumption that excess capacity is a part of the utility's equipment used and useful in the regulated business, that it can be included as a part of the rate base on which a return may be earned. When so included the utility gets its return not from capitalizing the maintenance cost, but from current earnings by rates sufficient, having in view the character of the business, to secure a fair return upon the rate base provided the business is capable of earning it. But regulation does not insure that the business shall produce net revenues, nor does the Constitution require that the losses of the business in one year shall be restored from future earnings by the device of capitalizing the losses and adding them to the rate base on which a fair return and depreciation allowance is to be earned. *Galveston Electric Co.* v. *Galveston,* 258 U. S. 388; *San Diego Land & Town Co.* v. *Jasper,* 189 U. S. 439, 446-47. The deficiency may not be thus added to the rate base for the obvious reason that the hazard that the property will not earn a profit remains on the company in the case of a regulated, as well as an unregulated business."

After pointing out once more the high average return earned during the pre-regulation period, "which included the severest depression in our history," the Court concludes its discussion of the bearing of the facts of the financial history of a public utility upon its claim to a separate and additional allowance for going concern value as follows:

"Whether there is going concern value in any case depends upon the financial history of the business. *Houston* v. *Southwestern Tel. Co.,* 259 U. S. 318, 325. This is peculiarly true of a business which derives its estimates of going concern value from a financial history preceding regulation. That history here discloses no basis for going concern value, both because the elements

relied upon for that purpose could rightly be rejected as capital investment in the case of a regulated company, and because in the present case it does not appear that the items, which have never been treated as capital investment, have not been recouped during the unregulated period.

"We cannot say that the Commission has deprived the companies of their property by refusing to permit them to earn for the future a fair return and amortization on the costs of maintenance of initial excess capacity—costs which the companies fail to show have not already been recouped from earnings before computing the substantial 'net profits' earned during the first seven years. The items for advertising and acquiring new business have been treated in the same way by the companies and do not in the circumstances of this case stand on any different footing. Cf. *West Ohio Gas Co.* v. *Commission*, 294 U.S. 63, 72."

The Amortization Base

In order to appreciate the full significance of this branch of the case it is important to clear up a question of terminology. The Court here uses the term amortization as the practical equivalent of depreciation. The specific problem is what should be the base upon which annual allowances of operating expenses are computed which will restore from current earnings "the amount of service capacity of the business consumed in each year." The Commission used as its base the sum of $78,824,009 which represented the total investment in fixed capital to the end of 1938, the beginning of the regulatory period, plus the estimated future net capital additions through 1954, the predicted end of the project, less salvage. It was conceded that an annual allowance of $1,557,852, computed on a 6½% sinking fund basis, would restore this investment.

The Company's contention was that the base should be $84,341,218, using reproduction costs less observed depreciation and included going concern value. Consistent with its previous conclusion that the constitutional requirement of due process does not require the Court to choose between investment or replacement costs, the Court approves the use of investment costs, as a matter of reasonable administrative discretion. "When the property is devoted to a business which can exist for only a limited term, any scheme of amortization which will restore the capital investment at the end of the term involves no deprivation of property." The Court slyly puts to one side the precedent of its decision in *United Railways* v. *West*, 280 U. S. 234, 265, where reproduction costs were approved as a depreciation base, by refusing to consider it.

The Amortization Period

It was necessary to consider the length of the amortization period because the lower court had held that unless the total investment were restored within the regulatory period of sixteen years, from 1938 to 1954, the rate of return would be confiscatory. The Court held, however, that under the decision in *Lindheimer* v. *Illinois Tel. Co.*, 292 U. S. 151, and in conformity with established business practice, the entire life span of business assets was available for the accumulation of amortization charges and had been so considered by the company. Moreover, earnings for amortization were available and adequate during the pre-regulatory period to absorb its due share of the annual consumption of capital in operations. The Court concludes, with surprising fidelity to accepted accounting procedures, that:

"The companies are not deprived of property by a requirement that they credit in the amortization account so much of the earnings received during the prior period as are appropriately allocable to it for amortization. Only by that method is it

possible to determine the amount of earnings which may justly be required for amortization during the remaining life of the business."

Amortization Interest Rate

What strikes the present reviewer as most important in this decision by our highest court is the consistency with which the Court applies an underlying theory of rate regulation and the discrimination in the use of technical terms, especially accounting terms. The long years of argumentation and discussion of this general subject appear finally to be bearing fruit. Nowhere is this more apparent than in the Court's treatment of the subject of the proper interest rate to be applied in setting up an amortization reserve on a sinking fund basis. The Commission had used a 6½% compound interest rate which the Company contended should be more nearly 2%, the presumptive rate at which a hypothetical sinking fund would now be able to derive income. To this contention the Court gives the following complete answer:

"But the argument ignores the fact that the amortization method adopted by the Commission contemplates not a sinking fund of segregated securities purchased with cash withdrawn from the business, but merely a sinking fund reserve charged to earnings and not distributable as ordinary dividends. Under this method there is no deduction of the amortization allowances from the rate base on which a fair return – 6½% under the current interim order – is to be allowed during the life of the business."

Gone is the hoary contention that a sinking fund theory of accumulating depreciation must use an interest rate which is less than the full rate of return.

Fair Rate of Return

Without much ado the Court accepts the Commission's finding of 6½% as a fair annual return upon the rate base because "supported by substantial evidence." It pointed out that most of the securities of natural gas companies were selling to yield between 3% and 4%, and that the interest on large loans ranged from 2% to 3¼%. In considering the risk factor, which is wrapped up in the single, all-inclusive allowance of a fair rate of return, the Court follows the reasoning of the *Bluefield* and other cases in establishing the degree of risk assumed. It points out the exceedingly favorable conditions of sale of output, with 90% distributed under long term contract to the Chicago District Pipeline Co., back of which are the three distributing companies who own 26% of the investment in the pipeline company. With respect to the risk of gas field depletion, the Court refers to the complete amortization of investment as affording "a security to the investment which is lacking to those industries whose capital investments must be continued for an indefinite period." Since the Company is in at least as favorable a situation with respect to all other elements of ambient insecurity as other similar businesses, the Court concludes that it cannot say on such a record "that the Commission was bound to allow a higher rate."

The majority opinion to which our comments have thus far been restricted was delivered by Chief Justice Stone. Four Justices wrote concurring, but separate opinions. Since the current belief, that the rule of *Smyth* v. *Ames* was definitely discarded in this case, seems to have had its origin in a separate opinion concurred in by Justices Black, Douglas and Murphy, this review is extended also to these separate opinions, including a cryptic one from the pen of Mr. Justice Frankfurter.

The issue between the majority and minority appears in the very first para-

graph: "But insofar as the Court assumes that, regardless of the terms of the statute, the due process clause of the Fifth Amendment grants it power to invalidate an order as unconstitutional because it finds the charges to be unreasonable, we are unable to join in the opinion just announced." In other words, the minority desires to push abstention from judicial review of commission rate orders to the point of abdication. On what reasons is this conclusion premised?

The major premise of the minority's argument is that price fixing by a legislature is not prohibited by the due process clause. Since rate making is a species of price fixing, rate making should find no limitations in the due process clause, except, perchance, that due process may continue to mean due procedure. Thus baldly stated, the position of the minority comes dangerously close to judicial abdication of a throne of sovereignty which the Court has occupied since its decision in the first *Minnesota Rate Case* of 1890.[2] There follows an interesting bit of argument *ad hominem*. In the *Munn* and *Peik* cases of 1877, which grew out of the Granger Movement, the Court, speaking through Chief Justice Waite, with Justices Field and Strong dissenting, "declared price fixing to be a constitutional prerogative of the legislative branch, not subject to judicial review or revision." In the *Railroad Commission Cases* of 1886 (116 U. S. 307, 331) Chief Justice Waite "indicated a yielding in part to the doctrines previously set forth in Mr. Justice Field's dissenting opinions." Complete reversal came by 1890 when "six Justices of the 1877 Court, including Chief Justice Waite, had been replaced by others." Then, "in a holding which accorded with the views of Mr. Chief Justice Field," the Court took the position that "due process" meant "reasonableness judicially determined."

It is this presumptive meaning which the minority read into the majority opinion and from which they dissent. What they are most concerned about is that their concurrence with the majority's decree of reversal in the pipeline case should not be interpreted as giving assent also to an opinion which they feel "gives renewed vitality to a 'constitutional' doctrine which we are convinced has no support in the constitution."

It should be noted that every Justice, joining in the minority opinion, approaches these questions, insofar as concerns their past experience, with a definite bias in favor of the validity of legislative and administrative action. As the court is now constituted, they certainly cannot be said to represent the "judicial tradition" on that body. It is this fact which gives point to the flat-footed statement with which Mr. Justice Frankfurter begins his brief opinion: "I wholly agree with the opinion of the Chief Justice," and it is also the animus back of the gentle ribbing which Mr. Justice Frankfurter gives his minority colleagues. While he regards the issue as wholly academic in a case where the statute definitely provides for "judicial review," he, nevertheless, "since the issue has been stirred" desires to add a few words "because legal history still has its claims."

Thereupon, ever so gently, the learned Justice proceeds to point out that Mr. Justice Waite, who wrote the opinion in the *Munn* case (of judicial non-interference fame) also delivered the opinion in *Stone* v. *Farmers' Loan & Trust Co.* (which expounds the diametrically opposite doctrine). He, therefore, correctly concludes that Chief Justice Waite

[2] *Chicago, etc., Railway Co.* v. *Minnesota*, 134 U. S. 418.

was the author of the doctrine of "confiscation" and its corollary, "judicial review." With a sly wink at the minority's own argument that the correct principle was stated in *Covington & Lexington Turnpike Co.* v. *Sanford,* 164 U. S. 578, 596, Mr. Justice Frankfurter reminds them that, "By no one was the doctrine of judicial review more emphatically accepted, and applied in favor of a public utility, than by Mr. Justice Harlan," who wrote the opinion which contains their "correct principle." As a final parting shot at the intransigeance of his colleagues he says, "if it be deemed that courts have nothing to do with rate-making because that task was committed exclusively to the Commission, surely it is a usurpation of the Commission's function to tell it how it should discharge this task and how it should protect the various interests that are deemed to be in its and not in our keeping."

We return once more to the minority opinion. Not content with their dissent on the question of the scope of judicial review, the minority insist that the instant case provides an opportunity for the court to rid the regulatory process of the incubus of "the fallacious fair value theory." This seems to have been the portion of the opinion which, for political reasons, was given the fullest publicity, thereby detracting from the much more substantial values inhering in the majority opinion.

The most quoted portion runs as follows:

"But we are not satisfied that the opinion of the Court properly delimits the scope of that review under this Act. Furthermore, since this case starts a new chapter in the regulation of utility rates, we think it important to indicate more explicitly than has been done the freedom which the Commission has both under the Constitution and under this new statute. While the opinion of the Court erases much which has been written in rate cases during the last half century, we think this is an appropriate occasion to lay the ghost of *Smyth* v. *Ames,* 169 U. S. 466, which has haunted utility regulation since 1898. That is especially desirable lest the reference by the majority to 'constitutional requirements' and to 'the limits of due process' be deemed to perpetuate the fallacious 'fair-value' theory of rate making in the limited judicial review provided by the Act."

Many years ago the present writer was persuaded that this rate-making rule had obvious limitations, but the vice of the situation was to be sought rather in the unimaginative and perverted use made of the same than in the historical circumstances which gave it birth. In the hands of legal practitioners, the use of the formula degenerated into a species of ritualistic incantation, not inaptly described as the "trance method" which deprived the formula of such logical development and refinement of which it was inherently capable. In keeping with the tradition of exorcizing this evil spirit, begun by Mr. Justice Brandeis in the *Southwestern Bell Telephone Co.* case, the minority undertake once more to joust with this windmill. Following a cue given by Professor Hale,[3] they condemn it because it "derives from principles of eminent domain"; because "fair value" obviously cannot be a composite of such discordant elements as security values, reproduction costs and historical costs; because it has proved "unworkable" in practice. What it all sums up to is that "the Commission is now freed from the compulsion of admitting evidence on reproduction cost or of giving any weight to that element of fair value."

By way of guidance to "the expert administrators charged with the duty of regulation," the minority then offer their own interpretation of "just and

[3] Hale, "Conflicting Judicial Criteria of Utility Rates," *Columbia Law Review,* Vol. 38, p. 959.

reasonable." This consists of protection of the investor interest by allowing the utility an opportunity to earn the reasonable cost of the service. However, this general rule finds its limitation in a *caveat,* expressive of the consumer interest and his point of view, "that a return on historical cost or prudent investment though fair to investors would be grossly unfair to the consumers." This leads them to make the confounding announcement that the "correct principle" had been discovered as long ago as 1896 in the *Covington Turnpike Co.* decision by the same Justice Harlan who wrote the decision they protest. (164 U. S. 578, 596):

" 'It cannot be said that a corporation is entitled, as of right, and without reference to the interests of the public, to realize a given percent upon its capital stock. When the question arises whether the legislature has exceeded its constitutional power in prescribing rates to be charged by a corporation controlling a public highway, stockholders are not the only persons whose rights or interest are to be considered. The rights of the public are not to be ignored. It is alleged here that the rates prescribed are unreasonable and unjust to the company and its stockholders. But that involves an inquiry as to what is reasonable and just for the public. If the establishing of new lines of transportation should cause a diminution in the number of those who need to use a turnpike road, and, consequently, a diminution in the tolls collected, that is not, in itself, a sufficient reason why the corporation, operating the road, should be allowed to maintain rates that would be unjust to those who must or do use its property. The public cannot properly be subjected to unreasonable rates in order simply that stockholders may earn dividends.' "

The circumlocution is complete. We are back again where we started, at the rate-making rule of *Smyth* v. *Ames* and its author, Mr. Justice Harlan. It is for situations such as this one that Coleridge's lines appear apposite:

"And as the hare whom hounds and horns
pursue
Fled from the place from which at first he
flew,
So I, my long vexations past,
Long to return and die at home at last."

This review should perhaps be terminated here. Yet the importance of the decision in giving the administrative commission the right of way, impels me to add a few thoughts in conclusion. The way being cleared for administrative development of the regulatory process, it is to be hoped that commissions all over the country will now be encouraged to use the accounting procedures, lately perfected with the help of federal agencies, in taking the rate-base problem out of the morass of replacement cost determinations and on to the terra firma of actual, historical costs. The minority says that "the decision in each case must turn on considerations of justness and fairness which cannot be cast into a legalistic formula. The rate of return to be allowed in any given case calls for a highly expert judgment. That judgment has been entrusted to the Commission. There it should rest." But, in reading these lines of the decision, it will be well for commissioners to remember the injunction of the majority that the courts will intervene if there is a clear showing "that the limits of due process have been overstepped." The majority like the minority is willing that the baby be washed; but unlike the minority, it is not willing that the baby be poured out with the bath water.

Federal Housing and World War II

By RUTH G. WEINTRAUB* and ROSALIND TOUGH**

I. The United States Housing Authority

DURING the present war emergency new programs for slum clearance have been shelved. This means that after the war we shall face once again the problem of housing the lowest income groups. Although the congressional attitude is at present unfriendly, a solution may be effected through the transference to low-rental developments of houses now being built for defense workers. Such a movement would be limited by three factors: First, sub-standard construction and poor planning of some of the present developments will in a relatively short period reduce them to slums. Second, part of the housing built in defense areas will be of little value when the emergency is over, since the war industry responsible for their existence will have ceased and the population concentrated at these points will have been dispersed. Third, some of the projects, such as dormitory units, are of temporary construction. Hence the difficulty any student of this subject must acknowledge in attempting prognostication at this time.

Doubtless post-war expenditures for public housing will be made as part of a vast public works program. These will help to cushion the transition from a war to a peace economy. At present, in deference to war needs, new programs for slum clearance are at a standstill, but the agency which had been primarily sponsoring them, i.e., the United States Housing Authority, has been active in the building of public housing for war workers.

The United States Housing Authority was created by Congress in 1937 as a government corporation in the Department of the Interior. As a result of the Reorganization Act of 1939, it was transferred to the newly created Federal Works Agency. Recently, together with fifteen other housing organizations, it has become part of the new National Housing Agency.

The United States Housing Act, which created the United States Housing Authority, may be said to have two basic objectives, slum clearance and low-rental housing. In many instances demolition of existing sub-standard housing in congested sections of a city with the substitution of planned communities in the same areas is not feasible. Instead, it often appears to be advisable to build in outlying districts. Under these circumstances, the Act, in harmony with its first objective, provides for what is known as "equivalent elimination," i.e., the scrapping of one unsafe or insanitary dwelling unit for each new family accommodation constructed elsewhere. The second important provision of the Act seeks to insure that the construction shall house low-income groups. These are defined as families "who cannot afford to pay enough to cause private enterprise in their locality or metropolitan area to build an adequate supply of decent, safe and sanitary dwellings for their use." [1]

Because it was generally recognized that an effective administration of the Act would involve local co-operation and because the raising of constitutional questions could be avoided if the localities themselves acquired the properties

* Assistant Professor of Political Science, Hunter College.
** Assistant Professor of Sociology, Hunter College.

[1] 50 Stat. 888 as amended. Sec. 2 (2) (1937).

and executed the program, the Act provided for operation through local housing authorities. Through loans and subsidies the federal government has "purchased compliance" to the extent that within less than five years thirty-nine states, the territories of Hawaii and Porto Rico, and Congress for the District of Columbia, have passed legislation which enabled the local areas to co-operate with the federal government.[2]

Under state enabling legislation a total of 623 authorized local housing authorities has been set up. Any one of these, the New York City Housing Authority for example, ascertains the local need for low-rental housing and in co-operation with the United States Housing Authority determines site, type of construction, plans and policies for each new housing project. To facilitate new construction, the Act permits the local authority to borrow to the value of 90% of the development or acquisition cost from the United States Housing Authority. In addition, this Authority grants an annual subsidy to each project to provide for its continuance as a low-rental housing project development. This federal subsidy is granted under the provision that the locality contribute at least one-fifth as much in the form of a cash subsidy or tax exemption.

To enable the United States Housing Authority to carry out this program, Congress has granted annual appropriations and in addition has given the Authority the right to issue bonds up to the amount of $800,000,000 which are largely tax-exempt. To ensure salability at low interest rates, these securities have been guaranteed by the federal government as to both principal and interest.

As has been pointed out, the local housing authorities are permitted to borrow up to 90% of the cost of a project. This means that the remaining 10% must be raised by the community. To facilitate this, the housing authorities are permitted to sell bonds which have now become legal investments for national and state banks. Records indicate that in a number of instances more than 10% of the cost of a new housing development is financed locally. The New York City projects are reported to have about one-fifth of their capital raised from sources other than the United States Housing Authority.

The Act makes additional attempts to preserve the low-rental character of the new housing by placing limitations on construction costs, but labor standards have not been sacrificed in the effort to keep down costs. Prevailing wage rates and hours of work are guaranteed under the Act.

Having secured the low-rental character of the projects, the Act also attempts to guarantee that families for whom the housing is built shall actually benefit from the new accommodations. It states that housing units "shall be available solely for families whose net income at the time of admission does not exceed five times the rental (including the value or cost to them of heat, light, water and cooking fuel) of the dwellings to be furnished such families except that in the case of families with three or more minor dependents such ratio shall not exceed six to one." [3]

A summary of actual accomplishments from 1937 through June 30, 1941, indicates how far the non-defense program of the United States Housing Au-

[2] "The only states which do not have such legislation are Iowa, Kansas, Oklahoma, Maine, Minnesota, Nevada, South Dakota, Utah and Wyoming." *Report of Committee on Housing*, National Institute of Municipal Law Officers, Dec. 4, 1941, p. 5 (mimeo.).

[3] 50 Stat. 888, Sec. 2 (1) (1937).

thority has left its impression on American communities:

Number of projects under construction or completed	585
Number of dwelling units	170,116
States represented	37
Total estimated development cost of projects	$803,489,000[4]

When the need for defense housing became imminent, the United States Housing Authority considered its organization to be singularly well equipped to handle the emergency housing situation. The Authority felt that it was the only agency with appreciable experience in the field of low-rental multi-family housing; it had collaborated with a nationwide organization of local housing authorities which could be called upon for assistance. As recently as the latter part of 1940 the point of view of the Authority that it might well be the "chosen" agency was indicated in the following quotation:

"Today, thanks to the integrated housing machinery of the federal government, defense housing can be speedily provided. Among the available agencies we now have a functioning group of local authorities thoroughly familiar with local conditions, competently staffed to undertake the construction of an augmented local program, unquestionably equipped to take over the operation of these defense housing projects, and—what is more important—willing and prepared to enlist themselves in the gigantic undertaking of sheltering the men and their families engaged in defense industries." [5]

In harmony with the vision of its role in defense housing, the United States Housing Authority was the first agency to take a step to meet the emergency. Thirty-three million dollars from its regular funds were transferred to local housing authorities and to the Army and Navy for defense housing uses.[6] With this step the Authority's leadership in the production of defense housing ended. Although approximately $1,000,000,000 has been voted for this purpose to date, none of the amount has been appropriated directly by Congress to the United States Housing Authority. Instead the Navy, the War Department, the Federal Works Agency and the President received direct Congressional appropriations. Through allotments from the Federal Works Agency, however, the United States Housing Authority has participated to some degree in the defense housing program. On September 1, 1941, the Authority had under construction, or completed, about one-fourth of the public housing units for defense workers. This meant that the other three-fourths of the accommodations were being built by other agencies.[7]

Naturally, Mr. Nathan Straus, Administrator of the United States Housing Authority, was perturbed by the trend of events. By January, 1942, sixteen major agencies were in the defense housing field. With the exception of the United States Housing Authority itself and the Farm Security Administration, the other agencies had little or no experience in housing construction. Mr.

[4] *Report of Committee on Housing,* National Institute of Municipal Law Officers, Dec. 4, 1941, p. 3 (mimeo.). From the inception of the war housing program, October, 1940, to May, 1942, it was estimated that 45,446 family units originally designed for slum clearance purposes have been transferred for use by defense workers.

[5] *First Annual Report, Federal Works Agency,* 1940, p. 188.

[6] Public No. 671, 76th. Congress, June 28, 1940.

[7] These include the Army, Navy, Farm Security Administration, the Division of Defense Housing of the FHA, Public Buildings Administration, and Defense Homes Corporation. To September 1941 these agencies and the United States Housing Authority had either under construction or completed a total of 125,479 accommodations for families or single persons. Since that date additional sums of $300,000,000 for temporary and mobile housing and another $300,000,000 for permanent housing for defense workers have been appropriated by Congress.

Straus illustrated this point by stating: "At the precise moment when it was imperative to make the most efficient use of existing machinery, new and untried devices were resorted to." [8] He complained before the Truman Committee investigating defense expenditures that his organization had received only "dribbles" of funds and had consequently been put in "last position" as a defense housing agency. Inter-agency rapport was not fostered by the fact that some of the new agencies "raided" the personnel of the United States Housing Authority.

Despite the fact that publicity was given to the alleged discrimination against the United States Housing Authority and despite the general recognition that the Authority's projects for defense housing had been well built, it lost the recent battle waged from November to January, 1942, for direct congressional appropriations. As a result of the controversy Mr. Nathan Straus offered to resign. The president accepted his resignation on February 17, 1942.

Seven days later a complete reorganization of the sixteen agencies concerned with war-time housing was announced by Executive Order of the President. As a result the United States Housing Authority was transferred to a new National Housing Agency. This agency is composed of three subdivisions: the Federal Home Loan Bank Administration, the Federal Housing Administration, and the Federal Public Housing Authority.

The Federal Home Loan Bank Administration functions in connection with financing home ownership and construction formerly vested in the Federal Home Loan Bank Board, the Federal Home Loan Bank System, the Federal Savings and Loan Insurance Corporation, the Home Owners' Loan Corporation, and the United States Housing Corporation (a World War I agency).

The Federal Housing Administration continues to exercise the same functions that it had formerly, i. e., guaranteeing or insuring housing mortgages.

The Federal Public Housing Authority amalgamates the agencies and personnel engaged in constructing housing with public money. It includes the functions formerly vested in the United States Housing Authority, Defense Homes Corporation, the non-farm public housing from the Farm Security Administration, and the defense public housing except on Army and Navy reservations (such as has heretofore been divided among the Federal Works Agency, the United States Housing Authority, the Public Buildings Administration, the Division of Defense Housing, the Mutual Ownership Defense Housing Division, the War Department, the Navy Department, and the Farm Security Administration).

The United States Housing Authority, one of the sixteen agencies involved in this coordination of housing, emerges as a part of the new Federal Public Housing Authority. Since the consolidation is so recent, it is not possible to say at what level co-ordination will take place.

Although the present status of the United States Housing Authority is thus determined, the future role of this organization in the field of public housing is by no means defined. In other words, what position will the Authority occupy in the post-war era when the problem of absorption of defense housing into a peace-time economy must be solved and the demands for slum clearance again become vocal?

When the war is over, some of the present housing for defense workers, because of sub-standard construction, may

[8] *New York Times*, October 30, 1941.

prove inadequate for peace-time occupation. A more serious limitation, however, is the re-emergence of the traditional point of view of a majority of Congress that the government should not compete with private enterprise. The current expression of this attitude can be seen in the following provision in the latest $300,000,000 appropriation for housing:

"That in disposing of said housing, consideration shall be given to its full market value and said housing or any part thereof shall not, unless specifically authorized by Congress, be converted to any public or private agency organized for slum clearance or to provide subsidized housing for persons of low income." [9]

The above quotation raises the pertinent question: is the war emergency being used as an excuse to scuttle the whole slum clearance program, or does this merely represent a passing attitude of Congress engendered by the controversy between public and private housing?

[9] Public No. 409, 77th Congress, January 21, 1942.

II. The Federal Housing Administration

The Federal Housing Administration, one of the many New Deal agencies organized to cope with a major problem of the Depression, has had its powers enlarged within the last year to meet a new emergency,—the lack of housing for defense workers in World War II.

For a number of years prior to 1929, there was a rapid expansion of the real estate market. After the Depression was well under way, however, a sharp reversal in the trend occurred. Because there was little effective demand for existing housing, there was small incentive for private industry to produce new structures. In 1934 the Federal Housing Administration was organized to create this incentive. As a result of the Reorganization Act of 1939, it was transferred to the then newly-formed Federal Loan Agency. In February, 1942, by Executive Order of the President, the Federal Housing Administration became one of the three subdivisions of the new National Housing Agency.

The Act which created the Federal Housing Administration was sponsored by certain banking, real estate and labor interests and bv specific groups within the government.[1] For the bankers the new legislation meant increased demands for housing funds; for the real estate operators it produced activity in the market; for skilled labor in the building trades it created new jobs. Sponsors of the legislation within the government have regarded it as one of the contributing factors to the recovery stage of the business cycle.

The Federal Housing Administration makes no loans or subsidies for housing; instead it acts primarily as a government insurance agency. It insures the mortgages of agencies lending for new construction purposes, i. e., saving banks, building and loan associations, insurance companies, etc. The result is that the risks of losses from foreclosure proceedings are removed from the shoulders of these agencies. Thus organizations financing new housing construction are willing to make loans at reduced interest rates.

Prior to the housing emergency created by the war, two types of loans were insured by the Administration, (a) those for repair, remodeling and redecorating of existing structures, and (b) those for

[1] 48 Stat. 1246, June 27, 1934.

construction of new buildings (Titles 1 and 2 respectively of the National Housing Act). Under the impetus of an accelerated demand for housing to service sections of the United States designated as "defense areas," Title VI was added to the Act on March 28, 1941.[2]

This amendment was designed to encourage private builders to participate in housing war workers. It was obvious that it was inadvisable for the majority of war workers to buy homes; thus a rental program appeared to be necessary. For the first time the new amendment makes it possible for Federal Housing Administration insured properties, for one to four families, to be built for rental as well as for sale. This is achieved through Administration insured loans to the builder. Prior to Title VI, such loans were made only to the owner-occupiers of new homes. Both prior to the war emergency and at present, Federal Housing Administration loans on new construction reach as high as 90% of the assessed value of the land and building. This leaves an additional 10% to be raised either by the owner of the home or by the builder.

Thus because the Federal Housing Administration requires that the purchaser have in general only an equity of 10% rather than the 25% heretofore essential for orthodox home financing and because the purchaser may make a small contribution toward the reduction of the mortgage and the payment of insurance and interest in the form of monthly payments, many persons, wisely or not, are encouraged to become home owners who would otherwise not consider home ownership feasible. As an additional encouragement toward home ownership, recent Federal Housing Administration regulations under Title VI give the prospective purchaser thirty months in which to accumulate the 10% required investment. This is accomplished through what amounts to a rental-sales contract, which is in existence until the equity reaches the necessary 10%. In other words, the would-be purchaser takes possession with a slight cash investment and accumulates an equity through monthly payments.

It cannot be stressed too often that the Federal Housing Administration lends no money nor does it provide direct subsidies for housing projects; the organization merely sets up an insurance system for mortgage loans. Insurance premiums are paid by the home owners.

The Federal Housing Administration is rapidly becoming a self-supporting governmental enterprise. For the fiscal year ending June 30, 1941, current revenues not only paid administrative expenses but left a surplus to contribute to reserves for payment of insurance losses. Losses not met from current revenue are still paid by the federal government through the medium of the Reconstruction Finance Corporation.

From its organization in 1934 until March 1, 1942, the Federal Housing Administration wrote a cumulative total of insurance covering 4,653,317 loans and aggregating $5,466,635,282. A little more than one-fifth of these loans have been written since the beginning of 1941, i. e., during the war period.

Title VI, which was added to accelerate the construction of housing privately financed, did not appear to be popular with builders during the first year. Less than 1% of the loans written during 1941 came under the provisions of the new amendment. Its unpopularity may be attributed to the fact that builders appeared to have little desire to become landlords. As late as the beginning of December, 1941, of the units completed

[2] Public No. 24, 77th Congress, March 28, 1941; Public No. 248, 77th Congress, September 2, 1941.

under Title VI and ready for occupancy, only 10% had been rented, whereas 65% had been sold and the remaining 25% were unoccupied.[3]

Recently, during the first few months of 1942, the new amendment has become more popular. In the month of April 70% of the applications for insurance to the Federal Housing Administration came under this provision. It has been reported that the Administration is giving houses insured through Title VI relatively high priority ratings.

All applications for priority ratings for privately-financed housing are processed by the Federal Housing Administration. Recommendations of the Administration are then forwarded to the Priorities Division of the War Production Board which makes the final decision. The role of the Federal Housing Administration in relation to processing has been responsible for a certain amount of confusion, i.e., the inference that all private housing is under the aegis of the Administration. Actually only about one-half of the single-family privately-financed houses built during 1941 (221,000) were constructed under the Federal Housing Administration program.

The Federal Housing Administration did not escape the conflict which involved the participants in the defense housing program during 1940-41. The battle lines in Congress and in the executive branch of the government were drawn between those who felt that every opportunity and encouragement must be given to private enterprise to build houses for defense workers and those who believed just as fervently that only the government could afford to build at levels which the vast majority of workers in war industries could pay. In the course of the struggle, congressional appropriations for public housing were held up and as a result the housing shortages in defense areas became acute. The President sent for Samuel I. Rosenman of New York City to make an investigation of this complicated situation.

As a result of Mr. Justice Rosenman's recommendations, the Federal Housing Administration, one of sixteen agencies involved, was transferred intact from the Federal Loan Agency to the newly-created National Housing Agency. It was hoped that this would end inter-agency conflicts affecting divergent public and private housing interests.

It is too optimistic to expect that this reorganization will bring harmony between the supporters of private housing and the proponents of public housing for war workers. The latter point with considerable justification to the fact that for the most part private operators cannot build houses to rent lower than $30.00 to $40.00 per month, varying in different parts of the country. Houses insured under the Federal Housing Administration may have rentals as high as $50.00 a month. On the basis of data on incomes of workers in defense industries reported by the Twentieth Century Fund in September, 1941, and later figures released by the Division of Defense Housing Coordination in December, 1941, at least one-half of the workers in war industries cannot afford to live in houses financed by private agencies. In addition, as one writer has phrased it, enticing families of relatively low incomes into home ownership results not in a vested interest but in having achieved a "vested illusion" of home ownership.[4] Small equities of 10% of the value of the property, recently permitted to be acquired over a 30-month period, support

[3] Letter, February 17, 1942, from Robert B. Smith, Assistant to the Administrator, Public Relations Division, Federal Housing Administration.

[4] Charles Abrams, "Rent Control is Not Enough," *New Republic*, March 16, 1942.

this conclusion.

The advocates of public housing further point out that the practice of granting priorities for private housing which a large proportion of the war workers cannot afford is questionable procedure. The supporters of private housing contend, however, that the new construction adds to the supply of available accommodations in the emergency areas, thus releasing lower rental housing for war workers.

Materials and methods of community planning and construction for both public and private war housing are generally conceded to be below pre-war standards. Even some of the pre-war housing developments built under the aegis of the Federal Housing Administration are potential slums. The southern half of Long Island is dotted with subdivisions of 40-foot lots with row after row of identical small brick houses. What the would-be purchaser does not generally comprehend is that neighborhoods constituted of row houses are not likely to improve in character. None of the amenities exist which result from the use of irregular set-backs from the street, the grouping of houses, the designation of streets for residential use and park space. It cannot be said that these Federal Housing Administration insured projects are any worse than thousands of others built by speculative builders. In fact, since the Administration sets up standards of construction, i.e., size of rooms, types of materials, etc., the homes under the Administration are on the whole of a better type, but projects consisting of rows of identical houses built on small lots represent a cultural lag according to the standards of far-sighted community planners.

Since much of the construction insured by the Federal Housing Administration is too recent in origin to know what the costs will be to maintain it in good repair, it is difficult to prognosticate what the incentive will be to retain title over a period of time. Certainly the small equity required adds little motivation; not much is lost if, after a few years, ownership is relinquished. If at some future time foreclosures should become widespread, quite possible in a falling real estate market, the question arises: Would the Administration insurance funds be able to meet the excessive demands made upon them? From 1934, the date of establishment of the Federal Housing Administration, to the end of 1940, only 3,547 foreclosures took place under Title II of the Act, approximately one-half of 1% of the total number of transactions.[5] All of these houses, however, were built and financed in a favorable market. In contrast, present construction is being developed under a rising price level. In the future, should a major slump in the real estate market occur, what proportion of the FHA-homes, financed at present increased price levels, will be able to weather the storm?

[5] *Federal Housing Administration Seventh Annual Report*, December 31, 1940, p. 57.

War-Time Adjustments in Farm Tenure

By RAINER SCHICKELE *

AGRICULTURE is called upon to produce more with less labor during the war emergency. This can be accomplished only by (a) increasing the efficiency in the use of all productive factors available in agriculture, and (b) increasing certain capital inputs which are not seriously competitive with our military-industrial war effort.

During the war period, therefore, it is necessary to examine tenure conditions with respect to their effect upon production efficiency.[1] More specifically, what factors in the present tenure situation interfere with (1) increasing the efficiency in those lines of production which need to be expanded, (2) increasing application of capital inputs necessary for such expansion, and (3) releasing redundant agricultural labor forces for more productive employment elsewhere in the war effort?

The lines of production which need to be expanded are principally oil-bearing crops (soybeans, flax and peanuts), feed crops (corn and high-yielding legumes), and dairy, poultry and hog products. The output of these products must be maximized not for the current year only, but for a series of at least three or four years, since it is extremely important in war time to prepare for the worst possible contingencies and provide for ample margins of safety.[2] Which, then, are the specific tenure conditions that constitute obstacles in the expansion of these products?

* Asst. Professor, Agricultural Economics, Iowa State College, and Agricultural Economist, Bureau of Agricultural Economics, U. S. Dept. of Agriculture.

[1] For a discussion of this problem, see R. Schickele, "Effect of Tenure Systems on Agricultural Efficiency," *Journal of Farm Economics*, February, 1941.

Tenancy and Livestock Production

Oil-bearing crops are annuals whose acreage can be greatly increased within one year, and tenure factors do not specifically impede such acreage increases. In contrast, expansion of livestock enterprises involves the projection of plans several years ahead, and requires investment in semi-permanent improvements which cannot be liquidated in one year. It is in livestock production on rented farms that prevailing characteristics of our tenancy system are bound to slow down the rate of expansion and to impair production efficiency.

The most important tenancy factors discouraging livestock enterprises on rented farms are (1) insecurity of occupancy and (2) lack of soil and building improvements and livestock facilities. These factors inhibit the effective response of the majority of tenant farmers, especially in the high tenancy areas, to most any price incentives for livestock expansion. Moreover, several other undesirable corrollaries are associated with these two factors, such as tenants' exploitive attitudes toward the farm, their lack of technical skill in livestock management, etc., which are frequently stressed in this connection. Substantial productive capacity could be released on tenant farms if some means could be found to increase the tenant's security of stay and to give him the opportunity of reinvesting part of his earnings into the farm enterprise in the form of semi-permanent and minor soil and building improvements—most of which will result in increased feed production and better

[2] See the extremely provocative article by John B. Canning, "Foods for Defense," *Journal of Farm Economics*, Nov. 1941.

livestock facilities and equipment.

Livestock enterprises require the planning of farming operations several years ahead. Probably as much as 90 percent or more of the leases run for one year only, and although their renewal may be tacitly understood in many cases, such informal and inexplicit understanding does not furnish the tenant sufficient security for making commitments and investments much beyond the end of each lease year. Except for tenants closely related to the landlord or operating under stock share leases, tenants cannot depend definitely on staying on their farm more than a year at a time, even though they actually may remain on the same farm for many years. This insecurity of stay seriously hampers the development of livestock enterprises.

Many observations indicate that the majority of tenant farms are underimproved; are inadequately equipped with buildings for efficient expansion of livestock enterprises. The same holds for the semi-permanent and minor improvements needed in livestock production, such as fences, water tanks, feeding floors, and the application of limestone and manure to improve yields and nutritive values of hay and pastures.[3]

These are input factors which cannot be liquidated within one year, but which are needed to increase production efficiently and profitably. Their deficiency on tenant farms is primarily the result of the fact that the tenant's investment in any kind of farm improvement is absolutely unprotected and accrues to the landlord automatically upon termination of the lease. Landlords, on the other hand, often fail to provide such improvements, because their anticipated returns from such investments are usually lower than those of the tenant if he were allowed to make these improvements himself under protection of a compensation clause and security of tenure.[4]

There are essentially three means by which these tenancy obstacles can be overcome, and which may need to be applied simultaneously in order to be quickly effective:

(1) providing tenants with a substantially higher degree of security of occupancy, which would permit and encourage them to plan their livestock production ahead for several years;
(2) protecting the tenant's investment in semi-permanent or minor farm improvements by guaranteeing him compensation for their unexhausted value in case he moves off the farm; and
(3) encouraging the landlord to provide the necessary improvements for an expanded livestock enterprise himself.

Recent observations clearly point in the direction of a markedly inhibited response of tenants to production incentives for livestock expansion which might be given to farmers, whether in form of higher prices, bonuses, subsidies, credit, or education. To the extent to which we remove these specific tenancy obstacles, we increase the effectiveness of whatever incentives are offered under the war program for agriculture, as well as the productive efficiency of the agricultural economy as a whole.

Production Credit

Another war-time aspect of tenure conditions is the inadequacy of credit facilities relative to the production needs in various tenure groups. Production in-

[3] Corn Belt data from various sources indicate that owners produce about 25% more milk, 33% more cattle and over 40% more hogs per 100 acres of farm land than tenants do. Cf. J. A. Baker, *Tenure Status and Land Use Patterns in the Corn Belt*, Wash. 1939, and Iowa Agr. Exp. Sta. Bul. 356, 1937.

[4] Reasons for this discrepancy in expectations between landlords and tenants hinge around the separation of control over durable and non-durable capital inputs in the farm enterprise. See R. Schickele, *op. cit.*

crease beyond what can be achieved by merely utilizing present resources more efficiently requires additional capital inputs; and these can be obtained from borrowing or from past savings, or from reinvesting part of the current income. Credit needs, therefore, must be considered in conjunction with accumulated capital reserves and the size and disposal of current income.

In the aggregate, the farmers' net position is that of a debtor. This largely eliminates farmers' savings as a source of additional capital for agriculture as a whole, although some individual farmers are able to draw upon such reserves. This situation leaves credit and current income as the main sources of increased inputs. Both are decisively affected by the farmers' tenure conditions.

A systematic analysis of available capital goods and requirements for additional capital in various tenure groups would be extremely helpful in remodeling our credit policies to war production needs. Many farmers, particularly on rented land and on small farms, have not been accustomed, in the past, to a wider and more diversified use of production credit. Since the war program calls for a most rapid expansion in certain production lines, a re-direction of production credit, and a revamping of the conditions under which it is to be granted is necessary.

Credit must be injected in those farms where the deficiency in specific kinds of capital is seriously hampering production expansion, and where the re-investment of the farmer's current earnings are not sufficient to remove these deficiencies. It is reasonable to assume that the spontaneous demand of individual farmers for credit, and the facilities now offered by the various credit institutions cannot be relied upon to effectuate an allocation which would accomplish this objective.

The establishment of a war production credit program to increase the effectiveness of the Food for Freedom campaign, the author believes should be cast along the following lines:

(1) Determine specific capital deficiencies regarding desirable output expansions, particularly on farms operated by tenants, low-income farmers and highly encumbered owners;

(2) Estimate roughly the amount the farmer can be expected to reinvest from his current income into these needed forms of input, after payment of living expenses, debts and savings;

(3) Make available credit in the amount and at terms based upon (1) and (2) above;

(4) Set up a list of purposes for which such loans can be granted, and limit from year to year the absolute aggregate amount loanable for certain scarce factors with an inelastic supply (phosphates, machinery, etc.), as well as the amount per loan, in order to minimize the inflationary effect of such a credit policy;

(5) The government should assume part of the risk and service charges of such special war production loans, and in return should insist that the loan be used precisely for the purpose for which it was granted; that managerial advice be furnished along with the credit, and that tenants and low-income farmers have equal access to this credit source.

In general, one might expect that a typical unencumbered owner has the easiest access to production credit, but needs such credit least because the part of his increased income available for reinvestment in the farm enterprise is greatest and his deficiency in capital equipment smallest. Conversely, the typical cropshare tenant finds it hardest to secure credit, but needs it most because

he benefits least from increased farm prices and output, the part of his increased income available for reinvestment is smallest, and his deficiency in capital is greatest.

Redundant Agricultural Labor

This is an opportune time to raise the question: To what extent can the war demand for industrial labor be seized upon to bring about an economically more efficient allocation of labor over our land resources from a long-time point of view? There are many farm families whose labor productivity is severely depressed because of the deficiency of land upon which it is applied.

In areas where it is not possible to reallocate the land resources among all present farm families so as to approximate more nearly an optimum labor-land combination, even after existing capital deficiencies have been allowed for, it could be in the interest of the immediate war effort as well as of the long-time rural welfare to induce the shifting of such redundant labor forces out of agriculture into other lines of production where their productivity would be substantially higher. Such situations exist particularly in the low-income farming areas of the South and Middle West.

Labor is becoming scarcer in industry as well as in large sections of agriculture. The drain of man-power from the age groups of between 19 and 44 years into the armed forces and the war industries can be expected to become very severe late in 1942 and during the next several years. There is a growing necessity of economizing labor resources throughout the economy. This situation is essentially good for agriculture. The economic value of agricultural labor is increasing relative to capital and land, which should make for better economizing of labor and for better wages and living conditions of the workers on farms.

There are, however, many farm families whose responsiveness and mobility to better job opportunities elsewhere are much lower than those of hired workers. Particularly on small subsistence farms the under-employed low-income farm families are not likely to move spontaneously. They constitute a huge reservoir of unused yet potentially productive labor resources. Many of these low-income farm families are so deficient in land and capital or managerial skill that their contribution to the war effort would be much greater in some non-agricultural work, or in some highly commercialized agricultural areas as hired workers, than it would be on their present under-sized farms, even if production credit and management advice were furnished them.

It would unquestionably be in the interest of the nation as well as the individual families concerned, if they could be assisted in finding more productive employment opportunities, which would yield them a better living standard even than that which they might attain with additional loans and supervision on their present farms. If, for instance, a low-income farm family could contribute $2,000 worth of products in industry, while on its present farm, even with loans and managerial advice, it would contribute only $1,000 worth of agricultural products at best, both the nation and family would benefit from the shift, and the government could well afford to spend several hundred dollars in assisting that family to find employment elsewhere and to move there.

Such a general policy might be implemented along the following lines:

(1) Find out who of the two million full-time "under employed low-income farm families" could reasonably be expected to increase their productivity

(and hence their living standard) more readily elsewhere than on their present farms;

(2) Make arrangements with various employment services and agencies to keep a current list of job opportunities in industry and agriculture with brief specifications regarding requirements in skills, age, experience etc., and information regarding type of work, wages and working conditions;

(3) Advise these farm families of such job opportunities, agricultural and non-agricultural, discuss with them the advantages and disadvantages of the various openings they might fill successfully; and explain in detail the assistance the government stands ready to provide if they decide to move. As long as we do not have general conscription of labor, the decision should be truly voluntary with the farm family;

(4) If a family decides to move, make every effort to consolidate the vacated farm with another under-sized farm nearby into a more efficient farming unit. Unless provisions are made, through whatever leasing or purchase arrangements are most suitable, to bring about such a consolidation of under-sized farms into more economic units, chances are that either an already large operator swallows up the evacuated farm, or another family moves in and continues the waste of labor force on a sub-standard level of existence.

A rough, but conservative, estimate of the order of magnitude of the farm labor force which could be freed by such a program for more productive employment within the next few years indicates that at least 250,000 farm families could improve their present positions substantially and increase their contribution to the war effort materially by moving off their present farms. If each of these families furnishes an equivalent of 1.5 to 2.0 full-time workers, and if their evacuated farm lands are operated by remaining neighbors in more efficient farming units, this shift would correspond to a net addition of 375,000 to 500,000 workers to our national labor forces—and an addition which could be injected at places in the economy where the labor shortage is most acute.

The problem of redistribution of the agricultural labor force is so fundamental both from the immediate war and the long-time viewpoint, that we can afford to spend a great deal of efforts and funds in implementing such a redistribution by various forms of administrative and educational action, currently supported by research and critical examination of results.

The problem should be attacked with the view of facilitating an economically more efficient, and socially more desirable redistribution of our labor force between agriculture and industry as well as between agricultural regions, for the purpose of raising the efficiency of our labor force and rehabilitating our pauperized farming areas. There can be no more opportune time for such an agricultural labor redistribution than the present war emergency, which places a high premium on labor productivity and requires active participation and high morale particularly on the part of the low-income and hitherto disadvantaged groups of our population.

Post-War Resettlement

There is a strong possibility of a backflow of people from contracting war industries and demobilized armed forces into agriculture after the war. National policy should, of course, be directed vigorously at planning the conversion of war industries to civilian consumption and capital goods as rapidly and with as little loss of work days as our coopera-

tive ingenuity can possibly achieve. Still, there will slacks; and whatever farmward migration should occur, it should be guided, channelled along certain lines and barred from others, if severe disturbances in tenure conditions, local taxes and public services, income levels, and the creation of self-perpetuating rural slums are to be averted.

For the purpose, it is necessary (1) to establish criteria on the basis of which certain areas might best be closed to the influx of settlers, and other areas might be designated as suitable for additional part-time or full-time farming units; (2) to develop various means which might be feasible to guide, advise and give financial assistance to settlers so as to provide for a reasonably balanced combination of labor, land and capital in the newly established enterprises under adequate tenure conditions; (3) to formulate policies which will prevent the bidding up of rents to unduly high levels and protect the occupancy of existing farmers and the equity of encumbered owners; and (4) to determine the areas and localities where migrants may find opportunities for temporary employment on farms or public works projects, which might tide them over until they can be re-absorbed by industry.

It must be emphasized that any such measures should be paralleled by employment services, industrial, public works and fiscal policies, which will minimize the farmward migration of workers and hasten the conversion of industry from war to peace production.

Elements in the Urban-Fringe Pattern

By RICHARD B. ANDREWS *

Some of the concepts developed in this article are, in part, the result of field work conducted under a University of Wisconsin WPA Research project. This study which was initiated by Prof. George S. Wehrwein and Scott Keyes in the environs of Madison has recently been under the leadership of L. A. Salter, Jr., in the metropolitan area of Janesville and Beloit, Wisconsin.

MUCH has been written in a general way during the past ten years concerning the maladjustments that have arisen with the growth of metropolitan districts surrounding our larger cities. Research work in metropolitan area problems has reflected a variety of approaches. MacKaye and Haig, for example, have made valuable contributions by their maps and descriptions of expanding urban centers, while Fisher and Cornick have strikingly presented the economic consequences of large-space subdivision of land into building lots. Other studies have dealt with the character of suburban life, problems of metropolitan government reorganization, transportation developments, or some other particular aspect of city growth and extension. Recently, field projects under the University of Wisconsin and others under the Bureau of Agricultural Economics have been attempting more inclusive economic studies of urban problems and ownership patterns in the rural-urban fringe.

Throughout these various lines of research in metropolitan phenomena there constantly recur hints and references to a group of cognate problems which appear to concentrate in a specific portion of the metropolitan area, namely, the immediate edges or fringes of urban agglomerations. However, few of these studies make a direct attempt to characterize this area as an organic unit. Therefore, it will be the purpose here to offer a tentative definition and limited description of what may be called the "urban-fringe."

The urban-fringe is the active expansion sector of the compact economic city. It is smaller in area than the *rural-urban fringe* which may be classed as that area adjoining the urban-fringe outward from the economic city in which there is an intermingling of characteristically agricultural and characteristically urban land uses. In short, this area is to be identified less as an active expansion area of the city and more as a transition area in which the rural land pattern begins to be affected directly by the urban economy through the introduction of major land uses which are not strictly rural.

It is also less inclusive than the *commuting area* or *the hinterland.* Delimitation of the commuting area around a city rests in determining the farthest points from which a significant number of workers commute daily to the central city. Strictly speaking, the urban-fringe is the first significant inner "ring" or segment of this commuting area which may extend in radial distance twenty or thirty miles from the city's center. On the other hand, the hinterland is frequently spoken of as that entire region served and "dominated" by a given city. In general terms it may be said to embrace all the land of the suburban area, the metropolitan region, and the trade area.

* Research Assistant, Department of Agricultural Economics, University of Wisconsin.

It is to be distinguished from the *metropolitan district* as defined by the United States Census. Current Census definition describes the metropolitan district as an area with a central city core of at least 50,000 persons, and an overall district density outside the central city limits of not less than 150 persons per square mile. A Census metropolitan district can contain several large cities and villages with sufficient internal pressures to create urban-fringes of their own.

Consequently, it is clear that if the urban-fringe represents the immediate expanding arms and edges of a single organic city its area and extent are not identical with the metropolitan district whose limits and content are dependent on a certain minimum of population density surrounding a city or group of cities. In addition, the metropolitan district definition does not include cities and districts below a certain size, although they too evidence urban-fringe growth.

Since the urban-fringe is a periphery growth phenomenon of an urban agglomeration, its beginnings and endings are in no way associated with village and city *political boundaries.* Urban-fringe expansion is characterized, roughly, by two phenomena, first, that of the star-shaped stringing out and clustering of relatively new, somewhat sparse, and often poorly regulated settlement along the main highways and watercourses leading into an economic city; and second, a slightly denser clustering of settlement between such highways closer in toward the city proper, known as interstitial growth.

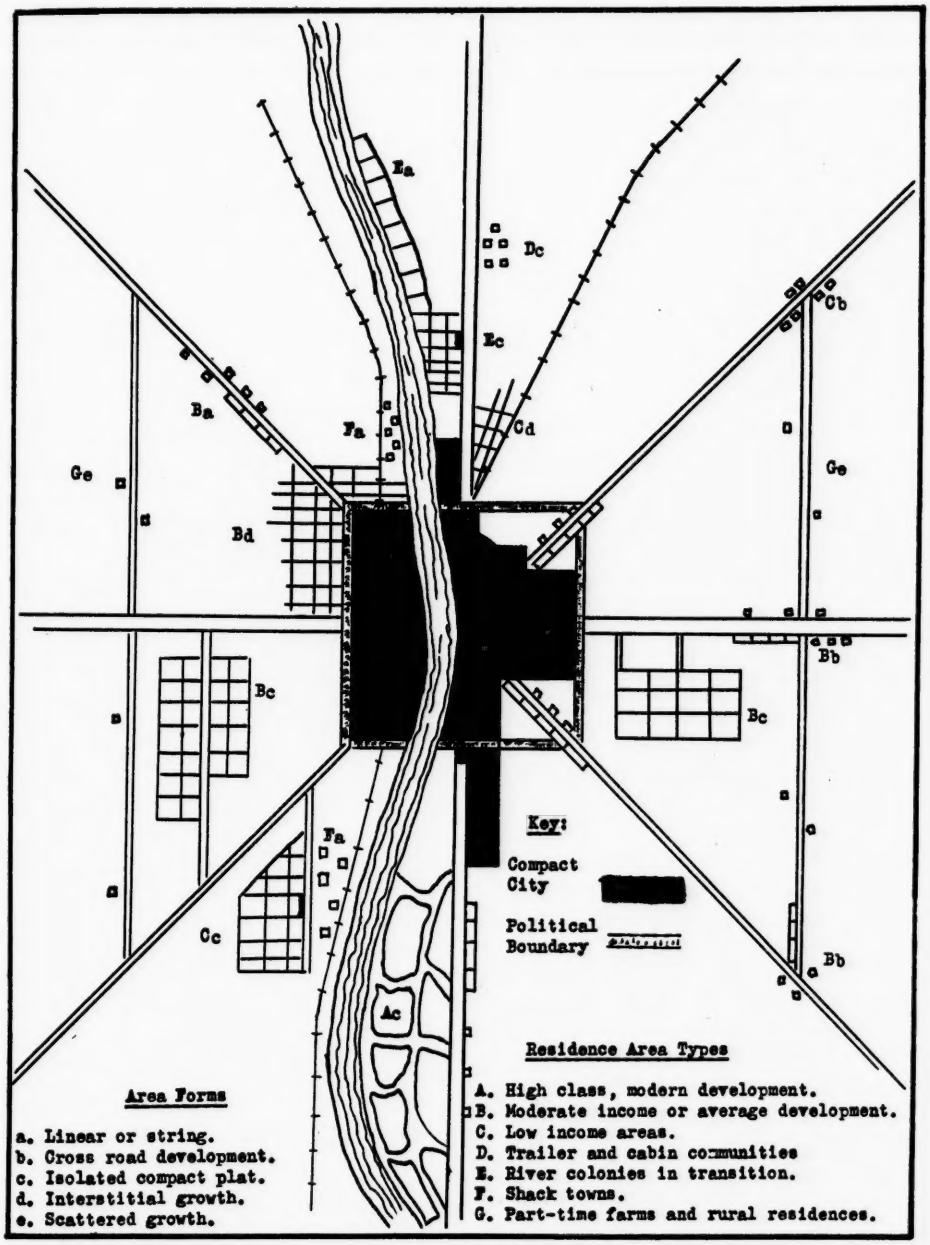
Mature metropolitan areas, of which Milwaukee and Boston are good examples, are circled by a series of large incorporations which both adjoin the central city and string out contiguously along the principal highways leading from the city. These incorporations are both so fused with the central city core and with each other that the entire group forms, virtually, a single city. In such an instance the central city may not have an actively developing fringe of its own, save for occasional gaps. Areas of expansion or fringe growth are in these cases to be identified with the edges of the economic city which are at the peripheries of the outlying incorporations.

On the other hand, small incorporations may adjoin the central city (as in Cleveland) with little or no settlement near the common boundary. In this case urban-fringe conditions must be said to exist between the nucleus of the incorporation and the well-settled portions of the adjoining city.

In addition, it is important to note that in the neighborhood of extremely large cities like New York and Chicago the urban-fringe is often so extensive that it completely embraces dozens of small villages and cities which do not directly adjoin the incorporation limits of the central city. Although these villages and cities have minor fringe growths of their own, the dominating influence may be that of the central city. Around the major satellite cities, however, a significant independent fringe growth may be expected.

This same independence of the fringe from political boundaries is also observable in cases directly opposite to the Boston and Milwaukee areas. The incorporation boundaries of some cities like Des Moines and Los Angeles embrace large areas of farm and open land. As a result, portions of the urban-fringe originate well within the city limits and may at some points remain completely inside the political city. Variations of this condition also exist in more simple urban patterns (small cities) which have

IDEALIZED MAP OF THE URBAN-FRINGE PATTERN



not yet been heavily ringed by consolidated incorporations. Finally, the urban-fringe should properly include certain small villages close to the city which were incorporated, within a relatively recent period, from a single subdivision or series of unincorporated subdivisions. These villages, in most cases, retain for a time the characteristics of the heterogeneous fringe from which they were formed. With further development these embryos may later be identified as cohesive urban communities in their own right or, depending on their location, as segments of the economic city itself.

Composition of the Urban-Fringe

The urban-fringe is composed of both urban residential and non-residential uses as well as extensive areas of vacant building lands which extend out along the main highways from the city. As these expanding uses invade the rural area adjoining the city, the rural land economy undergoes a transformation. It is in the nature and repercussions of this transformation that the problems of the urban-fringe lie.

Residential sectors, which predominate among the urban uses in the fringe, are characterized by areas still in the primary stages of development as city blocks, subdivisions, or a series of metes and bounds properties with few, and usually none, of the urban services like pressure water, sewer, pressure gas, paved streets and so forth.[1] Non-residential urban uses of the fringe include commercial, recreational, manufacturing, and institutional interests. These interests are usually closely identified with the central city economy. Such uses gravitate towards the outer areas relatively close to yet outside the economic city proper if the need is for large amounts of cheap, clear land at a favorable tax rate. Many uses arise from the search for freedom from restricting city ordinances and zoning regulations. On the other hand, uses are developed because of the patronage of the immense retail trade travelling the main highways converging on the city. Some developments toward fringe locations reflect a seeking of central positions from which to service the residential areas which characterize the outlying portions of any city. Freedom from the economic and physical disadvantages of the dense central urban structure, moreover, has promoted location in the fringe of yet other enterprises whose activity is impaired by traffic bottlenecks in congested areas.

Subdivision and sale of building lots on a large scale is to be classed as a dominant commercial operation rather than as a commercial use in the urban-fringe. Speculators in land sales and homes, as well as bona fide real estate developers, are attracted to potentially good sites on the edges of a city by a number of factors. Among these attractive forces are the low price of "raw" land and low tax rates which are advantageous in any land ripening process. Freedom in many cases from city building restrictions is yet another factor, while the opportunity to make speculative lot sales with little or no improvement investment is a condition primarily responsible for the thousands of acres of stagnating land surrounding our cities.

Dynamics and Patterns of the Urban-Fringe

Inasmuch as the urban-fringe is an extension of the central city it is natural to find in the area such urban compo-

[1] Although the presence of active land development in the form of relatively new subdivisions or acreage tracts is characteristic of most fringe areas, such activity is by no means coincident with the fringe. A city can conceivably have an extensive fringe with little or no subdividing in evidence.

nents as the residential neighborhood, the commercial district, and the industrial area. Depending on varying conditions and patterns of transportation, local government regulation, topography, city growth, rents and values, these urban forms will sometimes freely intermingle within the fringe. In other instances a rigid segregation will take place, while in the case of smaller cities a single use either commercial or residential will occasionally develop to the exclusion of all others.

Causes of Urban-Fringe Growth. Although the fringes of most cities are characterized by the more prominent urban uses, extensive residential areas predominate in nearly every case. Development of these areas has depended on a few basic factors with local variations:

1. With the arrival in a city of new industries or other sources of employment there arises a demand for building space by factories, wholesale warehouses, government buildings, and institutions. Since the space within the city's central or intermediate areas, often sought by these interests, is usually occupied by residences a displacement is inevitable.

2. Expansion of primary industrial or governmental activity brings in its train a migration to the city of an equivalent number of service and professional workers with their families. This virtual doubling of the new working population in turn sets up an intense demand for residential properties.

3. Arrival of the service and professional workers will promote the erection of stores, theaters, and service establishments of every description as well as numerous office buildings. This additional demand for space by non-residential users will contribute its impetus toward the displacement of residences.

4. Families who have been displaced by the encroachment of non-residential uses, and new families, usually of the professional and service class, have three customary alternatives in the location of their homes. Many move into those city sectors in which apartment buildings or converted residences predominate. A few may erect homes on the scattered vacant lots remaining in the central and intermediate areas. However, the larger part will tend to locate in the ever outward thrusting, periphery of the economic city.

5. Movement to urban-fringe areas has been further stimulated by high rents and values which have resulted from the excessive demand pressures of people on land and of business and industry on residences. The past decade of economic stress contributed to this flight. Urban-fringe areas provided a refuge from high city rents which were not scaled down with sufficient rapidity and from property tax burdens which had greatly increased in weight.

COMPARATIVE INCREASES OF POPULATION, EXPRESSED IN PERCENTAGES, OF SUBURBAN AND OF URBAN AREAS OF FOUR CITIES, 1920, 1930, 1940

Metropolitan District	1940 Population	Per Cent of Increase		
		1940	1930	1920
Chicago (city)	3,396,808	0.6	25.0	23.6
Outside city	1,102,318	11.5	73.4	x
Detroit (city)	1,623,452	3.5	57.4	113.3
Outside city	672,415	25.4	108.9	x
Milwaukee (city)	587,472	1.6	25.7	22.3
Outside city	202,864	22.8	77.7	x
Canton, Ohio (city)	108,401	3.3	20.5	73.4
Outside city	91,951	6.5	30.4	x

Source: *U. S. Census*, 1920, 1930, 1940. Data "outside city" for 1920 is not comparable with that for 1930 and 1940.

6. Within recent years the arrival of automobiles and good roads have "greased the ways" for decentralization of urban population. This form of transportation since it was rapid and infinitely flexible in its coverage, greatly enlarged the immediate "living room" of many cities and made more normal

growth possible outside the confines of the compact city. Moreover, this relatively sudden expansion of the city circumference induced a violent centrifugal movement of population from some central and intermediate urban areas. As a result certain business and residential sections suffered a blight which acted cumulatively in driving yet more population from these now declining sectors to the urban-fringe.

7. From a purely sociological point of view the large cities have, with their noise, dirt, and crowding become increasingly less desirable places in which to live. Some American families seem to be actively demanding a physical environment which is identified with sunlight, fresh air, relative quiet, space, and growing vegetation. These things have been found by many in the convenient fringes of the city as well as in the more distant suburbs.

8. Working with what have been termed "basic forces" in the creation of the urban-fringe are at least three factors which may be called "catalytic forces". Perhaps the leading catalyst is the auto and paved highway which has given a flexible form of escape to the city-bound resident and per contra, ready accessibility to the city for the fringe resident. Under the influence of this means of transportation the location of the "fringe home" is not tied to transit line routes and schedules but enjoys the independence of the broadcast highway network. A second catalyst which operates most effectively among the high and middle income classes is that of the "fashion trend" which tends to stimulate movement out of the city and the development of the "planned community type" subdivisions. Closely allied to and working in conjunction with the "fashion factor" is that of the "speculation factor" which is evidenced in the pressure selling of land and homes to city and rural residents. Speculative sales methods usually capitalize on the existence of high land values, rents, taxes, and incipient fashion trends within the city to push a rapid turnover of lots and homes. Uncurbed by local regulation, large real estate promotions can become highly potent stimulants to fringe growth.

Residence Area Types. Residential areas of the urban-fringe fall into fairly well defined categories which may be classified as (1) the "high class," modern developments, (2) "moderate income" or average neighborhood settlements of the FHA type, (3) low income areas, (4) trailer and tourist cabin communities, (5) shacktowns and Hoovervilles, (6) recreation areas in transition, and (7) part-time farms and rural residences.

(1) The "high class", modern developments are usually platted on the most desirable residential land available, usually high wooded sections, areas in the vicinity of parks or golf courses, lake or river front property. Their pattern is usually the most advanced in subdivision design with contour planning of blocks and streets, provision for commercial and community areas. They are often planned on a scale far more extensive than any of the other types. High values and building restrictions act hand in hand with exclusive zoning to make these areas sacrosanct, the secluded preserve of the wealthy or near wealthy.

Complete facilities for sewer and water, if not forthcoming from the disowned central city, are usually provided with no trouble by this financially self-sufficient type of community. The desire for exclusiveness and protection from the "bungling" and inexpertness of rural township government often leads these subdivisions into early incorporation as villages, when state law allows.

In short, the creative forces of these areas may be said to be a fashion trend toward exclusiveness and housing in a different mode, a dissatisfaction with the older residential sections of the city, and sometimes an opposition to the financial policies, high costs, and politics of the central city government.

(2) "Moderate income" settlements, or "average residence" neighborhoods are best characterized in terms of fringe housing by groups of relatively new, well kept one-and-a-half story frame homes in the $2,500 to $6,000 class. However, in plan these settlements are typified by row on row of "job lot" homes, usually representing slightly varying arrangements of one or a few basic designs, erected on a series of rigid rectangular blocks. Although not always located in the beauty spots of the fringe, subdivision areas of this type usually have a sound, healthful location on flat or gently rolling ground close to the best commuting highways.

(3) "Low income" subdivisions are often those which have been developed by quick profit land operators or inexperienced subdividers. They usually lack proper restrictions to exclude the erection of flimsy housing and unsuitable commercial units. Moreover, sewer and water facilities when tardily introduced to these areas carry too high an installation cost for the majority of the inhabitants. The quality of sites chosen for low income subdivisions frequently account for their characteristically low prices. Swamp land inadequately filled, proximity to railway yards, industrial plants and fuel storage tanks is the environment of the average low income area lot. It must be noted, however, that the low income area conditions mentioned are not typical of single homogeneous subdivisions only. Many times a subdivision which has attracted a majority of good homes will have a narrow band of flimsy dwellings and shacks bordering an adjoining railway or will have a sprinkling of these homes in certain blocks. Conditions of this type often develop from a late introduction of building restrictions.

Of recent years small experimental communities of "low cost homes" have been appearing here and there in the low income areas. Inexpensively, yet soundly constructed in the modern mode, they have been placed on the low priced lots of these fringe areas and represent the hopeful possibilities of eventual low income area redevelopment.

A variation of the low income area type is that of the metes and bounds residential development which tends to rise at fringe cross-roads and at points along the main highways in combination with commercial units. The unregulated nature of such developments combined with the negative effects of traffic and the neighboring commercial units often leads to a general deterioration but slightly less intense than that found in the low income subdivisions. However, it is not to be concluded that all metes and bounds developments are *per se* low income and poor quality areas. Many small settlements situated on a series of odd lots, widely separated from commercial uses, are of good quality and compare favorably with moderate income subdivisions.

In general, the low income areas are populated by families of restricted means who are either unable to meet city rents or who strongly desire home ownership at a low cost. Those prompted by the urge for home ownership often erect their own structures in these areas with a consequent pattern of rather unsightly housing.

(4) An urban-fringe pattern of more recent years is that of the tourist cabin

and trailer community. Although the primary purpose of these little communities has been the housing of auto transients, the pattern seems to be shifting rather decidedly, in some cases, to seasonal and even permanent residence for the marginal income classes. The majority of these communities, both trailer and tourist cabin, are located on the principal trunk highways not more than a mile or two from the city limits. Although cabin communities often have relatively desirable and well equipped sites, most trailer camp locations have tended to follow the path of least resistance, locating on odd bits of low valued land situated, many times, in close proximity to railways, fuel tanks, junk yards, swamps, and other undesirable conditions. Many of these sites, moreover, are being used by trailer owners as squatters rather than as renters from a camp owner. Therefore, trailer camps are, in many cases, but a step above the next general residential classification of the fringe, the shacktown.

(5) Shacktowns and "Hoovervilles" represent the lowest stage of residential housing in the fringe area, sheltering the derelicts of urban competition and the depressed racial groups of many cities. Shacktowns are, as a rule, a bit different in character from the Hooverville, although many combinations of the two often occur. A shacktown can be a homogeneous area of makeshift hovels of a semi-substantial nature on very hilly or very low land, separated from the neighboring city by a river, an industrial district, a railway, or some similar barrier. On the other hand, shacktowns on a smaller scale often exist as portions of what have been described as low-income areas. The line of distinction between the shacktown and the low income area is not always a clear one. While the low income area is often found on subdivided land, the shacktown generally is not, being a more sporadic and unregulated growth. Moreover, the quality of the structures in a shacktown is, as the term implies, very poor. Hoovervilles are inhabited by less permanent residents than the shacktowns. These residents have, with varying success, erected packing-box and sheet metal shelters which tend to locate on or near the city dumps, on over-flow flats, and along railway rights of way near the city. Both of these residential types appear, as a rule, adjoining the low rent residential and the industrial sectors of the central city periphery.

(6) A large number of cities in this country are situated on lakes, bays, or rivers. In most instances the shore frontage on these bodies of water extends far beyond the limits of the city proper. Consequently, there has developed in the neighborhood of these cities numerous park subdivisions or colonies of summer cottages occupied seasonally by the city dwellers. These colonies string out from the city along a river or lake shore in much the same way as do subdivisions along the main highways leading into a city. However, the settlement attraction in the cast of shore sites is recreational rather than one of transportation convenience. As a general rule these summer colonies have been established far longer as a part of the residential fringe than subdivisions or even city neighborhoods farther in, to ward the city's center.

Varying with the character of the recreational advantages involved and with the fashion trend, these plats will be populated for the summer season by middle, to high income families, who move either from the central city or other more distant cities. Those from the neighboring city generally spend the entire summer, commuting daily, while

those families from more distant cities either rent a cottage for a few weeks, or, if owners, rent their cottages to others when they have left for the season. During the past decade the financial difficulties connected with maintaining both a summer and a winter home have forced many families to rent or sell their summer cottages at whatever price they will bring. Also, summer cottage developments have sometimes been abandoned for their original use because of a change in recreational habits, or the development of some physical condition such as pollution, depletion, or flooding that alters the suitability of the site for the interest of the original holders.

A few families who have owned both a city home and a summer cottage have chosen to rent or sell their city residence and settle permanently in their lake or river cottage. Where this latter trend has taken place portions of summer colony areas have assumed the appearance of attractive, permanent subdivisions. On the other hand low income families of the central city have taken advantage of the trend toward sacrifice sales and rents in these former summer colonies of the fringe to locate in cheap, and at least semi-substantial housing near their work in the city. The influx of these families has tended to stimulate the further exodus of the original colony residents. Moreover, the process of this invasion has led in many cases to widespread blight and incipient slum conditions.

(7) Part-time farms and rural residences constitute a residential segment of the urban-fringe which, though not always numerically significant as compared to subdivided and rural-urban fringe areas, still represent a part of the typical picture of urban-fringe development. Varying in volume and type with the economy of the city and the hinterland, part-time farms are found scattered in metes and bounds acreage tracts along the main highways and county trunks both close to the city and far beyond the last subdivision. Occasionally, entire subdivisions are devoted to these little farms, although this practice seems to be the exception in most areas.

The character of part-time farming in the urban-fringe appears to vary with the intent of the owner. Some are operated purely as a hobby, giving the city worker a healthful diversion for his leisure hours. Others are operated with varying shades of direct economic purpose, some serving to defray the large food budget of the household, others preparing some cash products for a regular market. Rural residences, on the other hand, though assuming the broadcast pattern of the part-time farm within the fringe have, as a rule, only a small vegetable or flower garden and the inevitable garage. Many fringe "farms" are, under present ownership, no more than rural residences, all agricultural production having ceased with the shift in the owner's means of getting a living to urban sources or in the sale of the farm to city people. As a rule the original acreage of many of these "farms" has been substantially diminished by the sale of numerous small tracts for other rural residences.

Shaping of the Residential Areas. In the foregoing discussion of urban-fringe residence area types no mention was made of the physical forms or patterns in which they are found, and of the influence of transportation in molding these forms.

Most familiar form of urban-fringe residence growth to the casual observer is *the linear type* which extends along the main highways just beyond the limits of dense settlement of the city proper. These linear residence areas are usually identified by metes and bounds develop-

ments and by shallow "moderate income" subdivisions which extend a block or two back from the road and along it for four or five blocks. These "string" developments are, in a sense, the "feelers" of the city reaching out into new areas of settlement occasionally toward neighboring villages as connecting links. In its ready accessibility to a rapid route to the city lies the chief cause for the growth of this form. Linear growth is also characteristic of the lake and river colonies where the crowding of home near the water's edge may resolve into a thin line of riparian settlement for many miles.

Another common form of growth is *the crossroad development* which, as the name implies, is influenced in its shape by the flow and direction of traffic at principal highway intersections in the urban-fringe. This form, like the linear, is also characterized, at least in its early stages, by the metes and bounds residence type. Some of the higher class trailer and tourist cabin communities are also typical components of crossroad districts.

The most significant residential form in the urban-fringe is *the isolated, compact platted area* which covers anywhere from ten to fifty blocks as a single or series of subdivisions, usually having uniform restrictions, codes, and occasionally its own commercial center. In physical shape these areas are not molded by the transport system to the same extent as the linear and crossroad developments. However, these plats do, naturally, depend on the highway or transit line system and tend to hang as large fruit by slender stems from the main limbs of the transport vine. In some cases these areas are not connected directly with the main highways to the city and thus find it necessary to petition for more adequate connections. By so doing they influence the pattern of the fringe transport system rather than being directly molded by it. High class developments and moderate income subdivisions are almost invariably to be identified with the isolated compact platted area. Very often, low income areas and portions of lake or river developments are also in this form category.

The fan shape of the transport system as it enters a city rather rigidly confines and molds fringe areas which locate in the narrow angles where such lines begin to converge. Growth between these highway angles, or rail and highway angles may be called *interstitial growth,* and since it represents a consolidating movement of population, moves far more slowly in its outward expansion than the forms previously mentioned. The nature of interstitial growth varies between moderate income subdivisions and low income areas depending primarily on the nature of contiguous in-city neighborhoods, and the quality of settlement plans and restrictions.

Scattered growth, or the appearance of isolated rural residences and part-time farms along the main highways and side roads within the urban-fringe is the final distinct physical settlement form. Trailer camps and cabin communities are also perhaps more common to this form of growth than to any other.

Commercial Development in the Urban-Fringe. The development of commercial uses in the urban-fringe centers around six principal types which may be classified as: (1) certain types of business attracted to the main highway traffic streams converging on the central city; (2) business indigenous to the fringe, that is, retail units which seek the direct neighborhood patronage of fringe residents; (3) specialty produce and stock farms whose activities are often associated with the urban-fringe, though

more characteristic perhaps of the more outlying areas of the rural-urban fringe; (4) former central business district stores which have consolidated and moved to the edges of the city in order to gain a more central location in the residence area of one side of the economic city (the supermarkets); (5) business uses which are zoned or occasionally removed by ordinance from the central city; and (6) commercial uses requiring large amounts of land not available at the center of the city.

(1) Of the traffic-attracted retail units found on the main highways of the urban-fringe the most typical are the wayside market, the filling-station garage, soft drink stands, restaurants, tourist cabins, and trailer camps. Retail units of the traffic-attracted type usually experience a development which, in origin, is independent of the residential growth of the fringe, although their ultimate development may depend on trade from the subdivision areas themselves.

(2) With the development of residential city blocks, subdivisions, and metes and bounds properties, retail interests filter in, which directly service these immediate neighborhoods in preference to traffic trade. In approximate order of their arrival are to be found the small grocery, the drug store, bake shop, and beauty parlor. As a general rule these retail units locate in a central position with reference to a series of residential concentrations in the fringe. However, modern platting practice now provides specific areas for retail centers within a subdivision. In some cases, retail units are erected in the subdivision before actual residence construction is under way.

(3) Many urban-fringe areas are characterized by a very individual production economy which in a few of its aspects is strictly rural. If the demand of the central city market is favorable, the urban-fringe may be dotted with small truck farms, poultry farms, and specialty farms operated either as full-time enterprises or on only a part-time basis by city workers. Also it is not uncommon to find in some urban-fringe districts a wide and sometimes strange assortment of pheasant and fox farms, greenhouses, nurseries, dog kennels, antique shops, specialty craft shops, riding stables, and the like.

(4) A relatively recent trend in the dispersion of business units from central business district locations has found the supermarket grocery locating on main arterials at the edges of the city where settlement begins to thin. In most cases these markets can be definitely identified with the urban-fringe area. As previously mentioned, supermarkets have merely followed the center of "customer gravity" which has been moving increasingly outward from the center of the city toward the urban-fringe. Of course, considerations of cheaper land and lower assessments have also encouraged these huge units to settle in the fringe areas, for modern large scale merchandising and the need of patron parking space have put a new emphasis on the demand for space. Therefore, in the trend of supermarkets is to be noted an individual phase of fringe retail development which differs both from the traffic attracted type and from the direct fringe service type. The supermarket is, however, one of the principal grocery purchasing centers for fringe residents and therefore may, at least in part, be identified as a direct fringe service type. It differs from this type, nonetheless, in that a large proportion of its patronage is from the neighboring residential districts of the city proper.

(5) City ordinances and zoning laws have determined the location of certain

retail businesses in the fringe. A few cities have prohibited the operation of night clubs and dance halls within their limits. As a result these businesses have removed a short distance beyond the city limits, usually on a main highway accessible to both city and fringe patronage. Even in the absence of restricting city ordinances, taverns and night clubs have chosen fringe locations because of lax police regulation.

At the same time many municipal zoning laws have relegated business of the "nuisance" and heavy industrial class from the political city. Consequently, some of these urban businesses have situated themselves on the main highways, railway sidings, and water courses within a mile or two of the city limits. As a result junk yards have become an almost invariable earmark of the urban-fringe. Fuel yards, building supply yards, and gasoline storage tanks, also part of the nuisance class in many cities, tend to gravitate toward railway siding facilities in the fringe and are consequently less conspicuous than those nuisance uses which have located on the main highways.

(6) Certain commercial ventures such as pleasure parks, airports, and golf courses choose locations in the fringe due to a need for large, single blocks of land which are still relatively close to the patronage of the central city. In short, the locational factor here is primarily a spatial one. Commercial uses requiring a large land area such as airports and golf courses appear to have at least three fundamental effects on the physical development of the urban-fringe. (a) Both of these uses consume such large tracts of land that they often have a direct physical effect over the flow of residential development into the fringe which must necessarily either flow around or jump over them. (b) On the other hand, golf courses provide a type of "natural zoning protection" and their parklike effect tends to attract higher class developments. However, airports may have an opposite blighting effect due to noise and the danger of crashes. (c) Finally, both of these uses have a decided influence over certain types of traffic and hence may be a primary factor in the attraction of small retail units and in the development of local highways in the fringe.

Other Elements in the Urban-Fringe Pattern. In describing the configurations of the typical urban-fringe pattern a brief consideration of industries, institutions, and the transportation pattern is necessary. Definite and cogent forces have established the urban-fringe as a logical location for some industries and institutions. Institutions have been attracted by the isolation and quiet of the semi-rural fringe and the large blocks of cheap land available there that are necessary in the laying out of grounds and county farms. Industries of certain types choose fringe locations for a number of reasons. Among these is the need for cheaper land in anticipation of plant expansions, lower taxes in an effort to reduce fixed costs, more favorable switching and shipping connections on the belt lines or main highways, and compliance with city ordinances against "nuisance" industries.

Due to the fact that some institutional properties like cemeteries, state welfare institutions, or colleges established their locations during the early history of the central city, their properties have acted as barriers and hence rigid channelizers of later residential expansion into the urban-fringe. Industries of long standing have also assumed this role to some extent although their arrival in fringe areas has been more recent than that of most institutions. While acting as chan-

nelizers of outward thrusting city settlement, institutions and industries have, in addition, a more specific economic influence over urban-fringe growth. They have tended in some instances to attract large residential settlements whose occupants are either employees of the institution or plant, or have been attracted by the adjacent open grounds.

Institutions, industries, and residential settlements have all been influenced by and, in turn, have had influence on the evolving transportation pattern of the urban-fringe. The evolution of this pattern has naturally brought with it problems of adjustment. Expanding and displaced urban uses have flowed into an area in which a through transportation pattern of rails and highways was already frozen into a spoke-like service network between the central city, its hinterland, and other cities. Consequently, fluid settlement, industries, and institutions were forced into a mold which at intersection and convergence points produced odd configurations of blocks and streets which were thus fated to permanent blight. However, as the urban-fringe grew, a new and individual phase of transportation evolved. As the result of demands for more thorough local service there developed an independent system of local interconnecting highways, and full-coverage bus routes extended from the central-city system.

With large scale development of industries and the aggravation of traffic problems within the central city a third pattern of fringe transportation has also evolved, that of the belt railway and highway. This pattern, however, is more a part of the rural-urban than of the strictly urban fringe.

Economic Background of the Urban-Fringe

The economic support of the urban-fringe is similar to that of the familiar dormitory suburb in that the bulk of the residents are employed in the central city, commuting daily by foot, auto, bus and trolley. Thus far, no conclusive research has been done to show the overall economic status of these residents. However, scattered samplings seem to indicate that the spread between high and low incomes is greater in this smaller area than in the city proper since significant numbers of large estates and "jungle" shacks are found in the fringe area. These, nonetheless, do not typify the fringe, inasmuch as the majority of fringe residents appear to be moderate income families of the skilled and professional groups.

Although a majority of the fringe residents find their main economic support in the central city, the fringe, as previously described, does often contain significant sources of employment in the factories and institutions found there. These economic units often tend to draw the city out toward them and at the same time create employment for the fringe dwellers which is independent of the central city. However, the economic importance of most fringe retail trade in terms of employment is relatively inconsequential since this trade is concentrated in small traffic-attracted road stands, in clubs, taverns, seasonal tourist camps, and in small stores which serve local subdivisions. The bulk of truly important fringe retail activity appears to rest with the supermarkets and the business centers nearer the city proper.

Nonetheless, the production economy of the fringe, outside of occasional factories, is both distinctly individual and, in many respects, vital to the central city. Varying in importance with the nature of the hinterland and the position of the central city in relation to distant special-

ized farming areas, truck produce, eggs, and poultry may represent a significant contribution from the farms of the fringe. Within the production pattern of the fringe must also be included the wide range of highly specialized, and sometimes peculiar activities which appear to vary in their occurrence from city to city.

The economic sectors of the fringe have, of course, been formed by varying forces. Low income areas, for example, have their seed in the high rents, land values, and building restrictions of the central city, whereas the highest income sectors have arisen as the result of a desire for exclusiveness, broad acres, and lower taxes. Middle income groups on the other hand, although definitely influenced by the high taxes, land values, and rents of the central city have tended, apparently, to be motivated in their moves less by income and more by such factors as a desire for a suitable environment in which to raise their children, home ownership, a garden, new housing, and escape from the noise and dirt of the city. What the precise migration pressures are in the different areas, however, it is difficult to determine without more thorough research into the dynamics of urban-fringe growth.

Limited studies of metropolitan area rents seem to indicate that many residential rent sectors of the central city extend on into the adjacent urban-fringe developments, with high rent sectors tending toward early incorporation as villages and the low rent sectors toward fragmentary annexations to the central city or to other villages. Whether or not these sectors as they shift from city proper to fringe remain economically homogeneous as to occupation and income level is not yet certain although scattered evidence seems to point in this direction.

General Considerations

The appearance of urban uses within the rural area surrounding a city represents an invasion in social science terms. Invasion of the fringe is multiple, involving residences, retail units, industries, and other urban uses of the more extensive type. This class of invasion may be said to involve a general pumping up of land values, an intensification of demand for all public services, a radical shift in the general cultural pattern, a conflict of opinions in local government, and a basic change for the area in the means of getting a living.

The invasions of these rural lands which go to form the urban-fringe differ in at least two respects from invasions of urban neighborhoods within the central city. First, the influx of residents into a fringe area involves a displacement of original rural residents on a much smaller scale than that involved in the invasion of an urban neighborhood. In short, the rural citizen, rather than moving on, will often adapt his activities to the changes in the economy. For example, a farmer may take up part-time work in the city or a rural resident may turn to exploitation of the fringe movement itself. This exploitation might take the form of land speculation, the operation of tourist camps, or the opening of an eating establishment. Second, invasions of in-city areas take place on a pattern of streets and public services which are not fundamentally different from the other city areas, whereas fringe areas represent, to invading urban families, a community pattern quite different from that of the city. In a sense, the in-coming families are pioneering.

The discussions of this article have attempted to delineate the prevailing land use patterns of the typical urban-fringe, and the general process under

which the fringe area has experienced urbanization. Throughout, each pattern and process appears to be firmly tied to at least three definite categories of problems which may, as a group, be termed *the* urban-fringe problem:

First, there are those problems of transition and adjustment which affect the citizens of the areas into which fringe urbanization enters. For them urbanization may force a disruption of the mode of living, a change of economic activity, new governmental problems, and a readjustment of values as citizens in a transition area.

Second, there are the problems which arise for those who may move their residence or business to the city fringe. These people face difficulties of adjustment to a new and shifting environment in which new considerations, new neighbors, and an unstable pattern of facilities and institutions predominate. While in the city proper, there develops the necessity of community adjustment to the diminished use of certain existing facilities and to the extension of facilities to the newer fringe areas.

Finally, for the state and the nation as a whole the urban-fringe is a problem. Its traffic conditions are the concern of all in this motor age. Its influence on the tax structure of county and state may be profound. As one of the strongest social movements of this era, the processes of urbanization as they take form may be stamping the basic locational outline of our future social organization.

Utility Rate Problems Arising From Recent and Prospective Income Tax Legislation

By H. J. O'LEARY *

SOME of the major utilities throughout the country have indicated their intention to seek increases in rates, according to recent newspaper accounts, and in support of their position have cited tremendous increases in taxes, particularly federal income taxes, including excess profits taxes. The imminent possibility of such proceedings before state and federal regulatory commissions under existing war-time conditions raises several new and important problems with respect to rate-making functions.

Some illustrations of the effect and significance of recent changes in income tax legislation may be derived by a comparison of the operations of several large Wisconsin utilities in 1940 and 1941. A preliminary analysis indicates that for nine major companies furnishing principally electric, telephone, and gas service, net operating income before income taxes increased about 11% in 1941 over 1940, but for the same period net operating income (after income taxes) declined about 8.7%. This decline in net operating income was brought about by an increase of approximately 80% in income taxes. For the Wisconsin utilities most of this increase was due to the increase in the federal income tax rates, although our state income tax was increased by limiting the deduction for federal income taxes paid to 10% of taxable income.

It is well known to everyone familiar with public utility accounting that uniform classifications of accounts now prescribed by regulatory commissions permit deduction of income taxes as well as other taxes from operating revenue before net operating revenues are determined. Most of these classifications of accounts were prescribed prior to 1940 when income taxes did not constitute such a significant portion of the total tax burden. Immediately prior to 1940 the federal income tax rates applicable to public utility corporations were 19% and there were no corporation surtaxes or excess profits taxes except the declared value excess profits tax. As recently as 1937 the corporation normal tax did not exceed 15%. Compare this with the present federal income taxes which provide for a normal rate of 24% applicable to corporations, surtaxes of 6% and 7%, and an excess profits tax varying from 35% to 60%, the latter percentage applicable to excess profits over $500,000. However, even these rates will be dwarfed if the rates recently proposed by the Treasury Department become effective. Under the new proposal the surtax rate will be increased to 31% and the excess profits levy will start with 50% and provide for a tax of 75% on excess profits over $500,000.

Normally a corporation which is engaged in the sale of a product or commodity attempts to shift the burden of its taxes, if consumer demand and competitive conditions permit, by including such taxes in the selling price of its product. Whenever possible the corporation attempts to maintain or increase the net return to its stockholders despite increased tax levies even if it is necessary to increase the price of its product. In a

* Chief, Rates and Research Department, Wisconsin Public Service Commission.

sense, therefore, the corporation serves as a tax collector, and a good one at that.

Although their price structure, that is, the schedule of rates, is more inflexible and, hence, slower to react to cost trends, public utility corporations have functioned very successfully as corporate tax collectors. Unless prevented from earning a fair return by economic or political causes which cannot be remedied by increased rates, substantially every tax levied against a public utility corporation is passed along to the consumer in his bill for service. Furthermore, in this transfer process the taxes usually lose the attributes of their original incidence and acquire the characteristics of sales and excise taxes. Thus, income taxes, excess profits taxes, excise taxes, ad valorem taxes, social security taxes, capital stock taxes, and other forms of taxes may be so expressed in the rates for public utility service that they are passed on either in the form of a sales tax or of an excise tax or, more frequently, as a combination of the two.

Although federal income tax rates have been increasing for some time, it was not until the Federal Revenue Act of 1941 that they became so great as to affect seriously the tax collecting function of the public utility corporation. Under present and prospective levels of income taxes there is a serious question (1) whether public service corporations *should* continue to function in such a capacity, and (2) whether a public service corporation *can* continue to function as an efficient tax collector through the medium of rates. With respect to the first problem, in the absence of any direction or specific guidance from Congress, apparently there devolves upon the various regulatory agencies the function of determining whether, under present war-time conditions, it is reasonable to permit the collection of excess profits taxes and higher income taxes through increased rates for service.

A serious question of public policy is involved concerning the reasonableness and propriety of increasing rates for utility service in order to lift the burden of increased income and excess profits taxes from the utility. It does not appear wholly consistent that a corporation whose earnings are sufficient to incur the liability of excess profits taxes should be permitted to increase rates to cover the payment of such additional taxes. This inconsistency is not diminished by the fact that there is a difference in the standards of reasonable earnings as customarily determined by rate-fixing agencies and those prescribed by congressional fiat in tax legislation. Since Congress has provided optional methods of determining excess profits tax credits, one of which is the invested capital basis, it might not be amiss to apply the same standard to determine whether increases in rates should be permitted.

Congress, in providing for corporate income and excess profits taxes, presumably is exercising in a constitutional manner its powers to tax and to fix prices. It is quite apparent that the purpose of the excess profits tax is punitive as well as revenue-producing. "Windfalls" by way of increased income due to the war effort were intended to be decimated by the tax. If such taxes are made the basis of increased rates they lose their punitive effect to the extent that the wrong party is punished, that is, the rate payer instead of the stockholder. While it may be presumed that recent increases in the normal and surtax levels are not punitive in nature, nevertheless their relationship to the excess profits tax is such as to cast doubt upon their use as a basis for increased rates. Surtaxes like excess profits taxes have been added only recently as a part of an articulated war-financing

plan. Furthermore, since excess profits taxes are deductible in computing federal normal and surtaxes, all of the components within the income tax group should be considered as an integrated whole.

The increase in corporation income tax levels coincides with drastic increases in the individual income tax rates since the increases in both classifications are required to help finance our tremendous war effort. Again we may question the justification and propriety of compounding the individual's tax burden, which is by no means insignificant, by increasing public utility rates so as to provide "pre-war" reasonable returns after payment of "war-time" federal income and excess profits taxes. The individual's standard of living no doubt will decline seriously before this war is successfully concluded. There appears to be no justification for further accelerating this movement by increasing consumer rates so as to prevent a decline in the "corporate" standard of living as reflected by earnings available for common stock equity.

To eliminate tax increases such as those under consideration as a basis for increased rates, it will be necessary for regulatory authorities either to disallow such increases as proper deductions in determining net operating revenues, or to give effect to this item in the rate of return allowed. In view of the nature of the item, allowance for adjustment in the rate of return may be preferable, since the present and prospective high income tax levels will for practical purposes limit the rate of return. As the effective level of federal income taxes approaches 100% (an excess profits tax of 100% has already been proposed by some tax experts), the upper limits of rates of return, or for that matter, the rate base itself, will be fixed by congressional edict. Since the restriction will flow from the exercise of the federal taxing power, the effective relationship of rate of return and rate base may well be placed below the conventional standards which have been applied for regulatory purposes.

As a practical matter, the efficient functioning of public service corporations as tax collectors is jeopardized by the present federal income tax levies as well as by those in prospect. A practical demonstration of the fallacies of attempting to shift all of the tax burdens to the consumer by means of increased rates can be obtained by reference to certain specific examples. Thus, a large public service corporation furnishing electric service in Wisconsin which in 1941 had excess profits over $500,000 would be paying taxes on each additional dollar of revenue of about 75¢, of which about 65.7¢ would be federal income and excess profits taxes. Similarly, a telephone company under like circumstances would pay about the same amount, of which approximately 62.8¢ would go to the federal government.

Under the recent proposals of the Treasury Department these taxes would increase to about 89.8¢ per dollar of additional revenue for the electric utility, and about 88.7¢ for the telephone utility. The share retained by the federal government would be about 77¢ for the telephone utility and about 80.5¢ for the electric utility. Now, if either of these utilities sought to increase rates in order to increase its net return to pre-war reasonable standards, let us see what it would have to secure from the rate payers.

It would be necessary for the electric utility under the present federal income tax law to collect about $4.00 from the consumer in order to increase its net operating income by $1.00 (excluding

money required to meet increased expenses other than income taxes). The telephone company would need to collect $4.42, which includes the present 6% consumer tax, under similar circumstances. Under the revised tax rates proposed by the Treasury Department, the amounts collected would need to be $9.80 for the electric utility and $11.26 for the telephone utility. The latter amount includes a proposed 10% consumer tax on bills for exchange service. It does not take much imagination to observe that any attempt to make up serious deficiencies in net return would require rate increases of astronomical proportions, thus, adding to the already increasing inflationary trend of prices. As a practical matter rate increases under such circumstances would need be so great as frequently to exceed the value of the service and thus fail to accomplish the purpose for which they were designed.

No doubt, the foregoing practical limitations will in many instances discourage applications for rate increases made for the sole purpose of reimbursing the utility for higher income taxes and excess profits taxes. The most satisfactory solution, from a legislative point of view, would be to have Congress impose in the tax law now under consideration, such restrictions as to the incidence of increased income and excess profits taxes applicable to public service corporations as are deemed necessary and in the public interest. Such action by Congress, as part of its war-time financial program, might better withstand judicial review than action taken by regulatory commissions to achieve the same results. In the absence of affirmative action up to the present time, it may be presumed that Congress is not fully aware of the potential inflationary effects of current income tax legislation on public service corporation rates, and that the remedy therefor lies within the jurisdiction of the regulatory commissions.

An Actual Application of the Reproduction-Cost-of-Service Principle in Rate Making

By JOSEPH JEMING*

SINCE the theoretical case for the Reproduction-Cost-of-Service Principle was first presented, the writer has had the good fortune to have those theories tested by actual studies made in connection with a rate case.[1] This test makes possible a more complete and detailed analysis of the practical steps required for the application of the proposed principle. It also makes for a clearer understanding of the advantages and limitations which arise in the actual application of the Reproduction-Cost-of-Service Principle.

Basic Studies

The Reproduction - Cost - of - Service Principle, as the name implies, requires a determination of the cost of supplying the service. This cost is the total cost of operating expenses and fixed charges which would result if the demand for service were satisfied by facilities of the most modern, efficient and economical kind available in the market. The capacity of such service must be adapted to the demand which exists at the time of the rate determination. However, some effect may be given to load growth, if a definite upward trend is evident, by providing for such possible increases by means of necessary facilities. Such provision must be limited to a period not exceeding the time required for the construction of facilities to meet the expected additional demand for service.

The rate-determination in connection with which these studies were made was for the purpose of establishing rates for manufactured gas served by a public utility in a large metropolitan community.[2] The studies were prepared over a period of one year and apply to the conditions as of December 31, 1940. The studies were completed in January, 1942. During the year 1940, the base year of these studies, the company served over 750,000 customers and sold 24,000,000 M.C.F. of gas. The sales were distributed to the various service classifications in accordance with the following table.

Service Classification	M.C.F. of Gas Sold
No. 1—Residential Rate	19,002,000
No. 2—General Rate (non-Residential)	4,113,000
No. 3—General Rate (Large Volume)	528,000
No. 4—Heating and Air Conditioning (non-Residential)	248,000
No. 5—Seasonal Off-Peak Rate (non-Residential)	7,000
No. 6—Wholesale Rate	1,000
No. 7—Off-Peak Service (Large Volume)	13,000
Municipal Sales	88,000
Total	24,000,000

The determination of the cost of replacing the service requires several basic studies. These may be classified as statistical, engineering and economic. The statistical studies are required in connection with the selection of the most modern, efficient and economical plant. Any

* Statistician with Maurice R. Scharff, Consulting Engineer, New York City.

[1] J. Jeming, "Public Utility Rates on a Reproduction-Cost-of-Service Principle," *The Journal of Land & Public Utility Economics*, May, 1941, p. 138.

[2] Unfortunately for the complete development of the proposed principle of rate-making, the case was settled before any cross-examination in respect of these studies was conducted and before any rebuttal testimony was presented.

selection which involves a determination of total cost of service produced by means of a capital expenditure requires a decision as to a reasonable period over which such capital outlays are to be amortized. For the various types of facilities used by a gas utility such periods vary considerably. A reasonable, objecjective standard seems to be an amortization period which corresponds with the average useful service life of the facilities as grouped in the uniform classification of accounts prescribed by regulatory authorities. This grouping is suggested mainly because such a classification lends itself readily to statistical analysis of the accounting records which reflect past experience and not by virtue of the homogeneity of the facilities so grouped. Statistical analysis of property retirement forms the most objective means of estimating average useful service lives of physical property where adequate records of past experience are at hand, assuming that the past is a reasonable guide to the future.

Engineering studies are, of course, required for the purpose of selecting the most modern plant needed to supply the demand for service. Such engineering studies make possible a comparison of various types of plant available and take into account the respective first costs and probable operating expenses, together with the requirements of the market for the public utility service.

Before the final selection can be made which represents the most modern and efficient substitute plant, it is necessary to consider the relative economies of the various possible plants which may render the required service. At this point the rate of return needed to interest investors must be decided upon. It is assumed that such a rate may be taken as a "fair" rate of return. Furthermore, it is assumed that the interest rate which is to be used to calculate the annual fixed charges is equal to such a fair rate of return. The interest factor is considered in the determination of fixed charges for two reasons. First, the time discount element must be considered in evaluating the present worth of future amortization payments if consistency with the payment of a return on invested capital is desired. Second, the most equitable basis of calculating fixed charges is on the "equal annual payment" or "annuity" basis, because, all other things being equal, the annuity basis is the only one which makes the sum of amortization of capital and return on unamortized capital equal in each year the capital renders service by being invested in plant. In other words, the fixed charges determined in this manner are equal at each time interval if the plant investment is constant.[3] Under the "straight-line" amortization principle, for example, where equal amounts are set aside each year for return of capital, the base upon which a return on unrecouped capital is paid is a declining one, and therefore the fixed charges decrease as the property becomes older. This is true even if the service rendered and all operating costs become stable in time. Thus, in this instance the later consumers, in point of time, would receive a similar service at a reduced rate merely because of the amortization method used.

After these decisions as to the method of spreading fixed charges over time, the interest rate to be used, and the annuity (i.e., amortization) periods have been made, it is possible to select the proper plant which will, in turn, yield the reproduction-cost-of-service. All of these

[3] Should grouped assets be of such a nature (as they usually are) that replacements do not take place all at once, it is still possible to use the annuity basis provided the replacement function is known.

factors are necessary since the optimum plant can be selected only on the basis of optimum total cost of producing the service. The total cost consists of fixed charges and operating expenses.

Statistical Studies

The statistical studies which may be made in order to form a basis of establishing annuity periods for various classes of property depend largely upon the available accounting records. In most instances a record of additions and retirements with respect to fixed capital of a utility company is available for the period of years during which the accounting requirements prescribed by regulatory bodies were in force. Such data may be used to estimate average useful service lives of the property in the classified accounts on a dollar basis by means of a so-called "turnover" method.[4]

The turnover method has been subjected to criticism in that the early history, which must be considered in its application, distorts the estimates of average service life which are applicable to the property currently in service.

The "Actuarial" method which is free from the above criticism is preferred and may be used provided adequate data for its application are at hand.[5] The data consist of a complete accounting record of retirements in which the date of installation of property retired is given. Such information is yielded by the recently inaugurated continuing property records. In the case under review here, the actuarial method has been used to estimate average service lives of the various classes of the gas company's property since the required data were obtainable from the company's records. The life estimates were used as a guide wherever applicable in estimating reasonable annuity periods for the determination of the fixed charges upon the most modern and efficient plant. The applicability of such life estimates for the purpose was predicated upon two criteria. First, the life estimate which resulted from the application of the actuarial method had to be significant under the statistical criteria set up. Second, the most modern plant selected by the engineers to provide the required service had to possess life characteristics similar to those of the property whose past retirement experience had been analyzed, if the old were to be used as a basis of selecting an amortization period for the new plant. The latter criterion was one to be passed upon by the best judgment of the engineers, while the former was in the province of the statistician.

Since the actuarial method as such has many variations some of which involve arbitrary and subjective judgments, while others yield no definite objective statistical standards of reliability of results, the particular procedure which was applied in this case is described in detail below. In this connection examples are cited dealing with two property accounts, one containing the investment in Works and Station Structures and the other relating to Mains. Space requirements limit the number of analyses which may be included here and these two examples serve to illustrate the major points of interest. Furthermore, these two accounts represent over 43% of the total plant analyzed.

Essentially, the theory applied in the actuarial method used is predicated upon the assumption that the rate of property retirements out of an original group can be expressed as an analytic function of time. This general assumption has been

[4] National Association of Railroad and Utilities Commissioners, "Report of Special Committee on Depreciation," 1938.

[5] *Op. cit.*

used together with the specific assumption that $y=ax^n$ may be taken as one such function which expresses the relationship between the age of the property and the ratio of retirements at that age and the property which survives at that age or the base from which retirements are made. Thus, y=ration of retirements to plant surviving; x=age of the surviving property; and a and n are parameters based on the data analyzed.

This particular function has been selected because it is one of those functions which can be fitted by means of the method of least squares. It has also been possible to develop useful mathematical tables, i.e., the "K_n" table, which reduce the necessary computations to a minimum provided the form $y=ax^n$ is used. Empirically, it has been found that the results based on this function do not differ to any great extent from those obtained by means of the full polynomial function, $y=a+bx+cx^2 \ldots$ It is not intended here to go into the details of the statistical theory involved but merely to illustrate the results of the method used.[6]

In the case of Works and Station Structures, Table I shows the results of the statistical analysis of property retirements. Column (10) indicates that only in the case of n=1 is the value of t^a greater than 2. (t^a is the ratio of the parameter "a" to its standard deviation.) This criterion is used as an objective basis for deciding whether the paramater "a" in the function $y=ax^n$ differs significantly from zero. Therefore, the particular equation, y=ax, is used to estimate the average service life, L. However, before this estimate is adopted finally, an additional statistical check is applied. This consists of the arbitrary criterion that the standard deviation of L, indicated by the symbol, SL, is not to exceed 15% of L. The latter criterion indicates that the life estimate in this instance, based on the only significant function resulting from the application of the method of least squares, has too great a range of error to be used in forecasting the average service life of this class of property.

These results conform with the common sense conclusions which may be reached upon examination of the past experience. The property analyzed contains a plant investment of over $17,000,000 while the property retirements in the band of past experience amount to only about $150,000. Furthermore, in the case of Works and Station Structures, past retirements consist only of minor withdrawals of small parts of structures and no adequate experience with respect to the abandonment of integral buildings of the type now in use has accrued. These facts are mentioned in order to point out, in an obvious case such as this, how an objective method may warn of the unreliability of a statistical result. In this instance, the lack of reliability is expected on account of inadequate past experience but in many cases statistical results have been used indiscriminately because their unreliability was not as obvious and no objective statistical standards had been set up.

Thus, in the account cited, there is no objective statistical basis of estimating an annuity period to be used in calculating fixed charges on this type of property. Here the best judgment of the engineers must be relied upon.

In the case of the account Mains the results shown in Table II indicate that the past experience analyzed does yield a sound basis of estimating average service life. Here it is found that t^a is greater

[6] An article by this author to be published in a coming issue of *The Journal of the American Statistical Association* describes the mathematical basis of this method.

TABLE I. WORKS AND STATION STRUCTURES

n	$\Sigma(wx^{2n})$ (1)				C_{11} (2) = 1.00 ÷ (1)				$\Sigma(wx^{n}y)$ (3)				a (4) = (2) x (3)				$\Sigma(wy^{2})$ (5)			
1	10x	258	378	4245	10^{-10}x	387	029	2196	10^{-3}x	259	398	7500	10^{-3}x	100	394	8958	10^{-5}x	316	461	1742
2	10^{4}x	566	133	0521	10^{-13}x	176	636	9224	10^{-2}x	787	994	3025	10^{-5}x	139	188	8885	10^{-5}x	316	461	1742
3	10^{8}x	197	405	8267	10^{-17}x	506	570	6604		313	129	5641	10^{-7}x	158	622	2501	10^{-6}x	316	461	1742

n	$a\Sigma(wx^{n}y)$ (6) = (4) x (3)				$\Sigma(v^{2})$ (7) = (5) - (6)				Σa^{2} (8) = (7)x(2) ÷ (n-1)				Σa (9)				ta (10) = (4) ÷ (9)			
1	10^{-7}x	260	423	1048	10^{-6}x	290	418	8637	10^{-8}x	153	973	4057	10^{-4}x	392	394	4516				2.56
2	10^{-7}x	109	680	0511	10^{-6}x	305	493	1691	10^{-12}x	739	196	8932	10^{-6}x	859	765	6036				1.62
3	10^{-7}x	49	669	3160	10^{-6}x	311	494	2426	10^{-15}x	216	155	9509	10^{-7}x	147	022	4305				1.08

n	$\Sigma_L \div L$ (11)=1.00÷[(10)(n+1)]				Σ_n (12)				$a^{-1/n+1}$ (13)				L (14) = (12) x (13)				Σ_T (15) = (11) x (14)			
1				0.195																
2																				
3																				

TABLE II. MAINS

n	$\Sigma(wx^{2n})$ (1)				C_{11} (2) = 1.00 ÷ (1)				$\Sigma(wx^{n}y)$ (3)				a (4) = (2) x (3)				$\Sigma(wy^{2})$ (5)			
1	10^{2}x	220	175	7250	10^{-11}x	454	182	6761	10^{-2}x	250	989	8100	10^{-3}x	113	995	2236	10^{-5}x	118	401	4514
2	10^{5}x	458	486	0711	10^{-14}x	218	109	1341		138	995	0450	10^{-5}x	303	160	8891	10^{-5}x	118	401	4514
3	10^{9}x	147	859	6754	10^{-18}x	676	316	9182	10x	900	565	1253	10^{-7}x	609	067	4302	10^{-5}x	118	401	4514

n	$a\Sigma(wx^{n}y)$ (6) = (4) x (3)				$\Sigma(v^{2})$ (7) = (5) - (6)				Σa^{2} (8) = (7)x(2) ÷ (n-1)				Σa (9)				ta (10) = (4) ÷ (9)			
1	10^{-6}x	286	116	3951	10^{-6}x	897	898	1189	10^{-9}x	485	587	8220	10^{-4}x	220	360	5731				5.17
2	10^{-6}x	421	378	6142	10^{-6}x	762	635	8998	10^{-12}x	198	021	2568	10^{-6}x	444	995	7941				6.81
3	10^{-6}x	548	504	8866	10^{-5}x	635	509	6274	10^{-16}x	511	673	7055	10^{-8}x	715	313	7112				8.51

n	$\Sigma_L \div L$ (11)=1.00÷[(10)(n+1)]				Σ_n (12)				$a^{-1/n+1}$ (13)				L (14) = (12) x (13)				Σ_T (15) = (11) x (14)			
1				0.097																
2				0.049																
3				0.029		1.	281	8467		63.	655	1662				81.60				2.40

than 2 in all cases, that is, n=1, or 2, or 3. Therefore, the next step of calculating the ratio SL÷L is taken to determine which degree or value of n yields the best life estimate. The indications are that for n=3, this ratio at least, that is, the standard deviation of the life estimate, is .0293 or less than 3% of L. In view of this, the life estimate, L, is calculated as shown in Column (14) to be 81.60 years and may be taken as the best estimate of the average service life of the type of mains included in this account.

In this connection, it is to be noted that all of the accounting records used as the basis of the statistical analyses of property retirements were set up on a basis of book cost dollars which were classified in accordance with the Uniform Classification of Accounts in use until 1938. After this date, however, the prescribed classification of accounts had been changed in accordance with a subsequent order of the regulatory body. Table III which summarizes the results of the statistical analyses and which is based on the old classification of accounts had to be used as a basis of estimating average service lives applicable to the dollars regrouped under the new classification. This change had to be made inasmuch as at the date of this study as of December 31, 1940, the new classification was in effect. This regrouping of the book cost dollars with the related life estimates on a weighted dollar-year basis produced the results relative to the new account classification as of December 31, 1940 as shown in Table IV. The values of the respective life estimates shown in this table formed the final basis in the selection of reasonable annuity periods for the determination of fixed charges on plant investment made in the several classes of manufactured gas property.

Before closing the discussion of the statistical studies, it is worth mentioning the fact that, in conjunction with the determination of the average service lives of various classes of property, it has been possible to estimate the life expectancies of the respective classes of investment. This determination could be performed because the analysis of the company's records yielded information as to the ages of the grouped assets while the use of the function, $y=ax^n$, makes it a matter of simple computation to find the remaining life expectancy of the surviving units at any age. Such information is of value to the company in checking the adequacy of its reserves for depreciation and in making engineering or financial studies relating to investment problems.

Engineering Studies

The Reproduction - Cost - of - Service Principle requires that the most modern and efficient plant be selected only on the basis of the demand for service. This means that the engineers responsible for such studies would be put into a position in which complete surveys of the territory to be served, blueprints of proposed plans, and independent estimates of all of the numerous intangible factors which enter into the operation of a gas company would have to be made. Such a requirement would impose an insurmountable practical burden on the successful determination of the reproduction-cost-of-service. It seems that a more practical solution of the problem can be made without loss of objectivity. This can be accomplished by taking the existing utility system into account and making changes in those cases where engineers find that due to the present service requirements, availability of modern equipment or change in outlook for the future, substitutions and eliminations can be made effectively. Similarly, the

TABLE III. SUMMARY OF RESULTS OF STATISTICAL ANALYSIS

Classification of Accounts	Book Cost at Dec. 31, 1938	Degree of Type Curve	Average Service Life	
Works and Station Structures	$17,088,000	3 (a)	60	(a)
Holders	5,771,000	3	75	(b)
General Office Structures	2,734,000	3 (a)	60	(a)
Miscellaneous Structures	1,113,000	2 (c)	50	(c)
Boiler Plant Equipment	2,316,000	2	33.8	
Steam Engines	343,000	2	18.9	
Internal Combustion Engines	220,000	2 (c)	25	(c)
Benches and Retorts	2,794,000	2 (c)	30	(c)
Water Gas Sets	2,089,000	1	40.4	
Purification Apparatus	2,616,000	3	31.9	
Accessory Works Equipment	7,045,000	2	43.6	
Mains	20,221,000	3	81.6*	
Services	8,025,000	2	47.7	
Meters	6,563,000	3	31.2	
Meter Installations	1,735,000	2 (c)	50	(c)
Office Equipment	858,000	2	22.3	
Stores Equipment	36,000	1 (c)	25	(c)
Shop Equipment	178,000	3	28.5	
Transportation Equipment	485,000	–	7.4	(d)
Laboratory Equipment	99,000	3	22.5	
Miscellaneous Equipment	226,000	1	13.2	
Total Depreciable Plant	$82,555,000			

(a) Assumed—Result of analysis of experience not statistically significant.
(b) Assumed—Experience not representative of present plant.
(c) Assumed—Inadequate retirement experience.
(d) Weighted average of sub-groups.
* See column (14) Table II.

operating expense records of the company may be analyzed to find what the resultant changes would be if the proposed plant changes were made as well as what items of expense are not required for the adequate rendering of service to the consumers of gas. The operating expenses in the current year as shown in the books of account must, necessarily, reflect current costs. However, the book cost representing the investment in plant does not usually show current cost of plant but rather historical cost. Thus, in order to determine by difference the investment in the most modern substitute it would be necessary to develop an estimate of reproduction cost new of the existing system if current costs are to be used consistently.

In the case under review here, an estimate of the cost of reproduction new of the existing plant had been made as of December 31, 1940. This had been done in order to supply one of the elements in the determination of "fair value" which heretofore had been considered pertinent. This estimate made possible the application of the suggested method of estimating the first cost of the most modern plant by difference. The engineering studies which are described below resolved themselves into an analysis of the existing system to determine which portions could be eliminated, and where more efficient substitutions could be made together with the related estimates of savings in fixed charges and operating expenses. It is of prime importance here to note that these substitutions are to be predicated on the assumption that the most economic plant is to be used without giving any weight to the fact that a plant is already in service. In other words, comparisons between the

TABLE IV. RESULTANT AVERAGE SERVICE LIVES OF RECLASSIFIED BOOK COST DOLLARS

	Reclassified Book Cost Dec. 31, 1940	Average Service Life
Production Plant		
Structures and Improvements	$10,664,000	59.4
Boiler Plant Equipment	1,729,000	34.2
Other Power Equipment	839,000	51.7
Coke Ovens	4,214,000	34.9
Producer Gas Equipment	595,000	37.9
Water Gas Generating Equipment	2,778,000	40.2
Coal, Coke and Ash Handling Equipment	4,519,000	54.5
Gas Reforming Equipment	76,000	40.0
Purification Equipment	3,036,000	33.6
Residual Refining Equipment	1,091,000	48.5
Other Production Equipment	2,625,000	33.6
Storage Plant		
Structures and Improvements	6,270,000	70.2
Distribution Plant		
Structures and Improvements	1,432,000	58.5
Mains	20,913,000	80.4
Pumping and Regulating Equipment	1,317,000	36.1
Services	8,433,000	47.7
Meters	6,922,000	31.2
House Regulators	14,000	47.5
Meter Installations	1,812,000	50.0
General Plant		
Structures and Improvements	3,392,000	57.8
Office Furniture and Fixtures	820,000	22.3
Transportation Equipment	330,000	7.4
Stores Equipment	26,000	24.9
Shop Equipment	51,000	28.4
Laboratory Equipment	36,000	22.5
Tools and Work Equipment	251,000	11.8
Miscellaneous Equipment	31,000	22.6
Total Depreciable Plant	$84,216,000	

existing plant and available substitutes are to be made as though no plant were in service and an engineer is free to choose the most efficient. This differs from the usual engineering study relating to prospective retirement of existing facilities because in those cases, the available substitute must offer savings which are at least enough to amortize the first cost of such a substitute.

In accordance with the basic principles outlined above, the engineers have prepared studies in respect of the gas plant of the company, to determine what the sum of operating expenses and fixed charges would be if service were supplied by facilities of the most modern, efficient and economical kind available in the market as of December 31, 1940, of capacity corresponding with the requirement for service. These studies were prepared for subdividing the plant of the company into "study projects". Each study project consisted of a comparison of the first cost and operating expenses related to an engineering unit of the existing plant and the required most modern substitute respectively.

The engineering and other considerations as well as the resultant estimates of first cost as of December 31, 1940, and savings in annual operating expenses in the case of certain of these projects are described below. This is done in order to illustrate the necessary steps which must be taken in the practical application of the proposed principle. All the study projects in the four different types

of plants are listed, but only two are described in detail, namely, Study Number 9, and Study Number 19.

The study projects are listed below:

Production Plant

Project No. 1—Coke Ovens—Plant A
2—Water Gas Sets, Mechanical Grates,—Plant A
3—Water Gas Sets, Mechanical Grates, Waste Heat Boilers—Plant B
4—Liquid Purification — Plant A
5—Liquid Purification — Plant B
6—Salt Water Condenser — Plant A
7—Salt Water Condenser — Plant B
8—Station Meters—Plant B
9—Power Generation—Plant A
10—Boilers—Plant B
11—Store Room—Plant B
12—Tanks—Plant B

Storage Plant

Project No. 13—Booster and Holder Heating—Station I
14—Booster and Holder Heating—Station II
15—Booster and Holder Heating—Station III
16—Booster and Holder Heating—Station IV
17—Booster and Holder Heating—Station V
18—Booster and Holder Heating—Station VI

Distribution Plant

Project No. 19—Mains
20—Services
21—Meters

General Plant

Project No. 22—Structures—Gas Service Station
23—Structures—Laboratories
24—Structures—Office A
25—Structures—Office B
26—Structures—Office C

Study Project No. 9—Power Generation —Plant A

This study project has been developed after a survey by the engineers which indicated that a modern plant designed to perform the service of the existing one could effectively be made to produce its own electrical energy requirements instead of purchasing such energy from an electric utility company serving the territory.

The boiler plant equipment at Plant A is used to supply steam at 185 lbs. pressure, principally for use in driving auxiliary power equipment in connection with the water gas, coke oven, and general works operation. Some of the steam at this pressure is used for process purposes at the plant and at the adjacent holder station. The steam is exhausted at 6 lbs. pressure and used as such in the production of gas. Electrical energy purchased from the electric utility company is used for the requirements of the plant itself and for pumping gas and lighting at the holder station. The bill for electrical energy purchased for these purposes during 1938 was $138,728. The study made by the engineers found that all of the steam requirements of the plant during the year 1940 which amounted to 506 million lbs. of steam and all of the electrical energy purchased in the amount of 16 million Kwhrs could be made by modern and economical high pressure boilers and turbo generators.

The engineers in their study have substituted for the existing equipment three 600 lb. high pressure boilers with a capacity of 75,000 lbs. of steam per hour each. In addition to this, they have provided three 2,500 Kw turbo generator units. In order to permit balanced operation they have also provided two steam driven uniflow engine-driven booster units at the holder station. With this substitute equipment the engineers estimate that it would be possible to operate the plant under its 1940 power requirements without the purchase of

electrical energy from outside sources. This new arrangement would permit the plant to operate by passing steam at 600 lbs. pressure through the turbo generator units, generating electrical energy in the process, and exhausting the steam at 185 lbs. pressure which could be used for other requirements as at present. All of the energy in the steam at the 600 lb. pressure which would be used for electrical energy generation and exhausted at 185 lbs. pressure could not be utilized. The reason for this is that the requirements for 16 million Kwhrs annually require the evaporation of more than the 506 million lbs. of steam needed at 185 lbs. pressure and for process purposes at 6 lbs. pressure. This situation can be partially remedied by the use of the uniflow units at the holder station for pumping purposes which would perform the work now being done by electrically driven units. Thus, steam could be substituted in part for electricity as a source of energy for this purpose.

The engineers have estimated that if it were possible to obtain a perfect balance between electrical energy generation and steam requirements which take the place of purchased electrical energy, some of the steam generated at 600 lbs. pressure could be utilized only to the point of 6 lbs. exhaust pressure. This means that under the perfectly balanced conditions 110 million lbs. of steam at 6 lbs. pressure would be lost in any case. To allow for divergence from such a perfect balance in the practical operation of the substitute plant, the engineers have estimated that 1/3 more, or 146 million lbs. of steam, would be lost in this manner. However, the substitution would result in a more economical plant.

The net effect of substituting high pressure boilers, electrical generating equipment and other items required by this project would be to increase the first cost of the substitute as compared with the existing plant by $508,446 but would result in savings in annual operating expenses of $75,690 which consists mainly of a net saving in the cost of electrical energy purchased and improved efficiency of boilers, offset in part by higher fuel, labor, maintenance and water costs.

The detail of the first cost of the substitute is as follows:

Structures and Improvements	$ 612,468
Boiler Plant Equipment	1,130,733
Other Power Equipment	786,587
Coke Ovens	470
Producer Gas Equipment	23
Water Gas Generating Equipment	2,560
Coal, Coke and Ash Handling Equipment	55,035
Purification Equipment	3,683
Residual Refining Equipment	542
Other Production Equipment	28,016
Storage Structures and Improvements	29,462
Distribution Structures and Improvements	496
Pumping and Regulating Equipment	512,596
Office Furniture and Equipment	925
Total	$3,163,596

Study Project No. 19—Mains

The engineers have made a study of the transmission and distribution system of the company to determine what the most economical plant would be under present requirements of the service and available equipment of the most modern and economical kind. In order to do this, they have divided the territory served by the company into "gas consumption" areas on the basis of data furnished by company records for the years 1928-1940, inclusive. Utilizing these data, they have been able to determine in which of these consumption areas the load was increasing, decreasing or remaining static. They have also

made an analysis of unit costs as of December 31, 1940, to determine the relative economies of using steel and cast iron pipe, respectively, taking into account their probable average service lives to be used as a basis for estimating fixed charges on each. This analysis indicated to the engineers that it would be more economical to use plain end cast iron in the case of pipe over 18″ in diameter and that steel would be more economical for sizes 12″ and under. In the case of sizes 14″ to 18″, inclusive, the issue was doubtful. Inasmuch as it is the present practice of the company's distribution system to install steel pipe for sizes 12″ and under, the engineers have concluded for the purpose of this study that the most economic modern system would utilize steel pipe for sizes 12″ in diameter and under and use plain end cast iron pipe for the larger sizes.

In order to estimate the required capacity of the pipe lines needed for adequate service, the engineers have used the company's map records as well as their own studies of consumption areas as a guide. In the case of increasing load consumption areas, the engineers have provided in each street, mains of capacity equal to the existing mains with the exception that single mains were substituted, wherever permissible by virtue of the absence of streetcar tracks or heavy traffic or other interference, for parallel mains in the existing system. In the case of consumption areas which indicated static load, the same procedure was followed. However, in those instances where the studies of load indicated a declining demand for service all parallel mains were eliminated and substitutions were made providing capacity equal to the largest single main now in service. The net effect of these calculations was a decrease in the first cost of the transmission and distribution system mains of $8,000,000 at prices as of December 31, 1940, which resulted in the substitute system, the first cost of which would be $29,225,763. The engineers have estimated that no savings in annual operating expenses would be effected by the proposed substitutions.

Economic Studies

The completion of the statistical analysis and the engineering studies brings the determination of the reproduction or replacement cost of service to a point where the results may be integrated into a final whole. The average service lives taken from Table IV may be used as reasonable annuity periods in estimating the fixed charges to be associated with the most economic modern plant. There are, however, a few exceptions in those cases in which the engineers had reason to believe that the physical characteristics of the substitute plant differ significantly from those of the plant upon the experience of which life estimates were made. This is the case with a portion of the plant in the accounts for Purification Equipment, Other Production Equipment, and Mains.

The latter account, which is by far the most important by virtue of the large investment contained in this class of property, is also the most controversial with respect to probable average service life of substitute plant. The substitution of modern steel mains for the existing bell and spigot cast iron mains is justifiable under any circumstances because of the greatly reduced first cost. However, there is no experience with the type of main and its probable service life may be less or greater than that of cast iron. Nevertheless, the engineers estimate, on the basis of their experience with older types of steel pipe, that the average life is about fifty years as compared with eighty years in the case of

TABLE V. FIXED CHARGES ON SUBSTITUTE PLANT

	Cost New of Substitute Plant	Annuity Period	Annuity on Substitute Plant at 6%
Production Plant			
Structures and Improvements	$ 7,029,960	59.4	$ 435,471
Boiler Plant Equipment	2,066,975	34.2	143,593
Other Power Equipment—Turbo Units Project	786,587	37.8	53,059
Other Power Equipment—Miscellaneous	54,062	51.7	3,411
Coke Ovens—Ovens Project	3,505,733	38.8	234,828
Coke Ovens—Miscellaneous	72,691	34.9	5,018
Producer Gas Equipment	723,530	37.9	48,770
Water Gas Generating Equipment	2,927,719	40.2	194,339
Coal, Coke and Ash Handling Equipment	4,413,294	54.5	276,338
Gas Reforming Equipment	119,534	40.9	7,901
Purification Equipment	1,570,948)	40.0)	104,407)
	1,249,015)	33.6)	87,259)
Residual Refining Equipment	921,899	48.5	58,798
Other Production Equipment	46,770)	40.0)	3,108)
	2,703,697)	33.6)	188,886)
Storage Plant			
Structures and Improvements	8,325,551	70.2	508,033
Distribution Plant			
Structures and Improvements	1,573,245	58.5	97,625
Mains	29,225,763	57.1	1,818,836
Pumping and Regulating Equipment	1,638,381	36.1	111,965
Services	13,881,728	47.7	888,028
Meters	9,394,629	31.2	672,928
House Regulators	15,997	47.5	1,024
Meter Installations	3,764,165	50.0	238,814
General Plant			
General Structures	4,044,144	57.8	251,307
Office Furniture and Equipment	924,560	22.3	76,273
Motor Vehicles	336,611	7.4	57,660
Garage and Repair Equipment	35,810	7.4	6,134
Stores Equipment	29,785	24.9	2,333
Shop Equipment	57,856	28.4	4,292
Laboratory Equipment	36,984	22.5	3,038
Tools and Work Equipment	282,251	11.8	34,060
Miscellaneous Equipment	34,337	22.6	2,814
Total Depreciable Plant	$101,794,211		$6,620,350

cast iron. The difference in fixed charges on the substitute which would result from annuity periods varying from fifty to say one hundred years would be about $60,000. Furthermore, the engineers have estimated no savings in annual operating expenses would result from the proposed substitutions. This conclusion may be reasonable in the long run but under the proposed principle, lower maintenance on new plant must be taken into account. Thus, any savings in operating expenses during the early part of the life of the new plant could be applied to reduce, equally, the annual costs of the service over the total life of such plant. In the case of mains such an analysis might easily mean an inclusion, for the purpose of this study, of annual savings of as much as $300,000. These points are mentioned here but are not used in the final analysis.

The results of the application of annuity factors to the first cost of the most modern and efficient plant, at prices as of December 31, 1940, utilizing the average service lives from Table IV except as mentioned above and a 6% rate of return are shown in Table V. Similarly, Table VI shows the annual operating ex-

TABLE VI. DETERMINATION OF OPERATING EXPENSES RELATED TO MOST MODERN AND EFFICIENT PLANT

	Operating Expenses of Existing Plant	Savings By Substitution	Operating Expenses of Substitute Plant
Production Expenses	$ 5,559,645	$ 345,085	$ 5,214,560
Distribution Expenses	2,971,436	37,702	2,933,734
Customers' Accounting and Collecting	2,277,944	–	2,277,944
Sales Promotion	856,054	856,054	–
Administrative & General	1,868,851	2,500	1,866,351
Taxes—General	3,527,995	–	3,527,995
Total	$17,061,925	$1,241,341	$15,820,584

penses of the existing company reduced to the extent of the savings which would result from the proposed substitutions.

It is to be noted that the Sales Promotion item in the amount of $856,054 is eliminated from the operating expenses on the substitute. This conclusion is reached on the basis of an analysis of the company's records as to new business assigned to the Sales Promotion Department. Even if all of such new business at average costs per unit of gas sold were considered, the amount of revenue from this source does not justify the expense incurred. Furthermore the net profit on such business is so far below the sales promotion expense that no justification for its allowance as an expense can be made, even on the premise that some old business might be lost due to the abandonment of the sales promotion policy.

The item of Taxes-General was left unchanged since it contains mainly real estate and Special Franchise Taxes which are usually based on an assessed valuation to produce revenue for the local government. Such assessed valuations are largely the result of compromise and do not usually relate directly to the "fair-value" of plant as determined in a rate-case.

Thus at this point all of the operating expenses and the fixed charges on the tangible depreciable plant have been determined. It remains only to estimate the fixed charges on land, to make provision for the amortization of the expenses which might be incurred in connection with the organization related to the replacement service, and to provide a return on working capital.

The question of the present value of land to be included in the determination of the replacement cost of service is the most difficult one. All of the hypothetical substitutions proposed in the engineering studies could be made in actuality. The costs which are only estimates might not be accurate, but the only possible error is in the estimates and not in the principle. The case of land is different. It might not be possible to acquire land where needed at all, and under the best of circumstances there might be land available but owned by the present utility company. It seems best to this writer that land be valued at original cost to the present utility company when the location of plant is unchanged. Admittedly this is a departure from the exact principle of replacement cost but it appears to be preferable to at best, doubtful valuations of real estate appraisers or to an impasse when land is not available, as required for the substitute plant, except in the hands of the present company. In this study the original cost of land on the books of the company is $6,600,000. This includes the cost of some land at one of the plant locations which is not

required by the substitute, as well as land at one of the station locations eliminated as not required by the demand for service. After these eliminations it is estimated that the value of land to be used for the purpose of this study is $5,800,000 and the fixed charges at 6% are $348,000 annually.

The amount allowed for Organization Expense can be taken as six months' wages and salaries of the key employees in the General Office, Distribution Department, Customers' Service Division and Branch Offices. Since most key people happen to be on a monthly payroll basis it is not difficult to earmark their annual earnings in the company's expense statements. Thus six months' salaries and wages are $1,500,000 in round figures and this figure may be taken as Organization Expense. If this sum be capitalized, then a six percent annual return upon Organization may be allowed in the amount of $90,000.

The necessary working capital may be estimated in two ways which are commonly used for the purpose. One is to take six weeks' gross revenue, the other is to take the difference between current assets and current liabilities.

In this instance the former as well as the latter are approximately $3,000,000. A return of 6% upon this sum would add $180,000 to the cost of the service.

The total of all costs thus far are in round figures as follows:

Fixed Charges:

Land	$ 348,000
Depreciable Plant	6,620,000
Organization	90,000
Working Capital	180,000
Total Fixed Charges	$ 7,238,000
Operating Expenses	15,821,000
Total	$23,059,000

Assuming that the substitute system would incur the same bonded indebtedness as the existing company at the same rates, 5% per annum, its deductible interest charges on long term debt for income tax purposes would be $2,500,000. Furthermore the Internal Revenue Department usually approves an overall depreciation rate of 2% on depreciable manufactured gas plant. This would permit an additional deduction for tax purposes of $2,040,000. Thus the total deductions from income for tax purposes would be approximately:

Operating Expenses	$15,821,000
Interest	2,500,000
Depreciation	2,040,000
Total Deductions	$20,361,000

If the amount allowed in the determination of total cost of service for federal income tax, at 24% current in 1940, and the local gross revenue tax at ½ of 1% be $852,000 and $120,000, respectively, then the final gross permissible revenue to the existing utility company may be summarized as in Table VII.

TABLE VII. DETERMINATION OF TOTAL PERMISSIBLE REVENUE UNDER THE REPRODUCTION-COST-OF-SERVICE PRINCIPLE

Fixed Charges	$ 7,238,000
Operating Expenses	15,821,000
Allowance for Taxes:	
Federal Income (at 24% on net income)	852,000
Gross Revenue (at 0.5% on gross revenue)	120,000
Total Permissible Revenue	$24,031,000

This result compares with the actual revenue of this company for the year 1940 of $24,268,000 from its gas operations. In other words, a reduction of approximately $237,000 is in order. Although the Reproduction-Cost-of-Service

Principle does not undertake to determine rates to various classes of consumers it is suggested that rate reductions in this instance might be made to the consumers in Service Classifications No. 1 and possibly No. 2. This suggestion is made because the rates in all other classes are largely competitive with other forms of fuel while the smaller residential users are limited as to choice of fuel in the usual range of rates for gas. The effect of this reduction upon the income statement of the existing utility company would be, roughly, as follows:

Gross Revenue		$24,031,000
Less: Operating Expenses	$17,062,000	
Interest on Long Term Debt	2,500,000	
Gross Revenue Taxes	120,000	
Depreciation	1,714,000	21,396,000
Taxable Net Income		$ 2,635,000
Federal Income Tax at 24%		632,000
Amount Available for Dividends		$ 2,003,000

The figure of $2,003,000 compares with $2,182,000 in the annual report for 1940. It is to be noted that the amount of annual depreciaiton shown above of $1,714,000 is based on book cost and is not to be confused with the depreciation figure used in arriving at the deductions for tax purposes in determining income taxes on the substitute system.

Final Comments

This case study makes possible certain conclusions as to the usefulness of the Reproduction-Cost-of-Service Priciple in rate-making which heretofore had to be left to conjecture. The limitations may well be reviewed first since the advantages have been adequately covered in the first part of this paper. Yet it can be repeated that the hope that engineering studies made in connection with rate-cases would point out means of improving the operating of existing plants has been fulfilled in many instances in this case.

The limitations of the Reproduction Cost-of-Service Principle are as follows: First, the cost of studies is high. Many of the studies in this case had been made for other reasons, such as conformity with the prescribed classifications of accounts and original cost determinations, Reproduction Cost New studies to conform with the "fair-value" doctrine laid down in the *Smyth* v. *Ames* case, and statistical studies made in rebuttal of commission witnesses. If all of these costs were charged against the proposed principle, the cost might run as high as $1,000,000. However, the cost of future determinations would be lower under compliance with modern accounting practice for gas utilities.

Second, the engineering estimates of first cost and therefore of fixed charges are probably subject to some variation. A divergence of opinion of 20% as to the probable first cost of the substitute would result in this case in a difference of $1,250,000 in permissible gross revenue. Similarly, differences in estimating annual operating expenses might result in variations of as much as $300,000 as in the case of Mains.

Third, there might be differences of opinion as to reasonable annuity periods to be used in estimating fixed charges. This may be borne out by reference to the probable range of error of estimated average service lives predicated upon the statistical analyses. However, this point is not as serious as may appear on the surface. Under the proposal to use the equal annual payment principle in computing fixed charges, the interest rate is controlling and the annuity periods do not carry much weight when such peri-

ods are longer than thirty years. For example, in the case of Mains a difference of 50 years in the annuity period means only a difference of 0.3% in fixed charges.

Fourth, the question of fixed charges on land leaves much to be desired; and the amount to be allowed as fixed charges on the item for Organization may be subject to criticism and disagreement.

Finally, the recent case, *Federal Power Commission* v. *The Natural Gas Pipe Company of America* and the *Texoma Natural Gas Company* in the United States Supreme Court, makes the future issue as to rate-making theory doubtful. The concurring Justices express the opinion that the regulatory body, in this instance the Federal Power Commission, "is now freed from the compulsion of admitting evidence on reproduction cost or of giving any weight to that element of 'fair value.'" This means that utility companies will probably no longer authorize studies of reproduction cost as such, and the burden of costs associated with this type of study would have to be charged wholly against the Reproduction-Cost-of-Service Principle.

The results of the estimates of the replacement costs of service in the manufactured gas company rate-case which has been described here, lead to an interesting conclusion. The total permissible revenue is very close to the actual earnings of the company during the test year. Furthermore, the permissible revenue which would obtain under the so-called "Prudent Investment" theory is not greatly at variance with the company's earnings. "Prudent investment" as the rate-base is taken here to be original cost of the property when first devoted to public service less straight-line depreciation while actual operating expenses of the existing company are allowed. On the latter basis the gross permissible revenue would be approximately $23,600,000. Of course, one case is not a sufficient basis of forecast, but it can at least be said that this instance does not contradict the author's contention that the justification for the "Prudent Investment" theory, if any, lies not in the theory itself. The justification for the latter theory may be found if the replacement cost of service can be shown to be approximated by the revenues estimated on the basis of original cost less straight-line depreciation in general. Thus the contention of adherents of the straight-line theory of depreciation that "loss in value" may be expressed as a function of time may be borne out in that the final rate determinations will produce revenues which are compatible with the "value" of the service itself.

Urban Land Department

Some Considerations in the Economic Possibilities of Slum Clearance

IN the planning for post-war reconstruction that is going on today, the thoughts of an increasing number of people are turning to the possibilities of urban reconstruction. In fact, an urban reconstruction movement seems to be assuming impressive proportions. It is held that the rebuilding of great portions of American cities which have become badly blighted is both an economic and social necessity, and offers probably the greatest single possible outlet for that employment which will be desperately needed when millions of soldiers and war workers turn their activities to peacetime pursuits. With this thesis there is not much room for argument. Nevertheless, a note of warning is in order.

The clearance of residential slums is but one part of the larger task in view. Yet anyone who has followed the vicissitudes of public housing in this country for the past decade knows that many stubborn economic problems remain to be solved before substantial progress can be made in slum clearance—especially the rapid and supple type of progress which is required by a program that is dominated by a work-giving motive. Some method of meeting these economic problems must be found before planning can proceed; and before the problems can be solved, they must be clearly stated and understood.

As will be pointed out, one of the chief problems is that of creating an effective demand for housing among persons now living in slum areas. A detailed analysis of this problem as it applies in one particular case will be presented here. The situation described in Danville is believed to be fairly representative of slum conditions in hundreds of other moderate-sized American cities.

Danville, Illinois, is a city of 36,919 persons, and has a total of 11,522 dwelling units. Late in 1939, the Danville Housing Authority conducted a housing survey covering some 4,269 units in eight substandard housing districts. The survey showed 2,481 of these units to be substandard. Further examination of the survey showed that of the districts enumerated, three could definitely be said to be slums. Five areas were classed as blighted areas, the blight ranging in degree from mild to acute. Map 1 shows the general configuration of the areas.[1] This paper discusses the findings in the area (indicated by an arrow on the map) which lies directly south of the central business and industrial district, and is bounded by the Wabash Railroad tracks, Park Street, and the Vermilion River. In addition to being a slum, this district is also the center of vice in the city.

Housing Characteristics

The type of housing in the fourteen blocks in this district is predominantly single-family residences, with a fairly frequent intermixture of two-family houses, and a scattering of units in combination business-residential structures. Of the 242 dwelling units enumerated, 178, or 75 percent, were single-family residences, but these ranged all the way from small shacks to fairly substantial houses. Five had but one room, 16 but two rooms, and 26 but three rooms.

Only a tenth of the units were reported to be in standard condition. Of the substandard units, 133 (55 percent of all units) were classified as "not repairable" while 85 (or 35 percent) were "repairable." (Table 1.)

[1] For the purposes of this map, "blighted area" includes any block in which 25 per cent or more of the dwelling units are "substandard," i.e., needing major repairs, or unfit for use, or lacking toilet or bath or central heat, or overcrowded; "slum area" includes all block sides in which 50 per cent or more of the units are "not repairable," i.e., unfit for use, or needing major repairs and at the same time lacking central heat or toilet and bath.

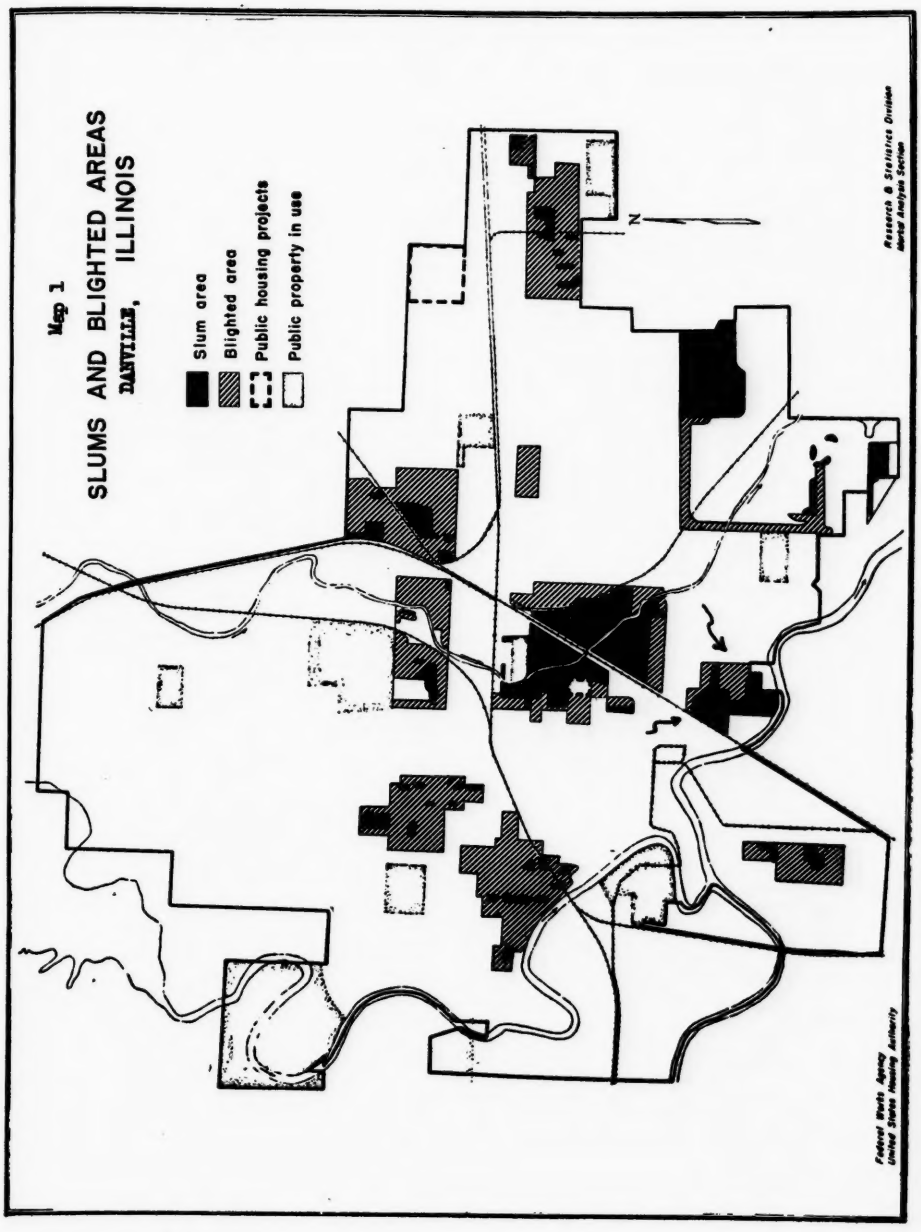

Map 1
SLUMS AND BLIGHTED AREAS
DANVILLE, ILLINOIS
Slum area
Blighted area
Public housing projects
Public property in use
N
Research & Statistics Division
Land Analysis Section
Federal Works Agency
United States Housing Authority

TABLE I. DWELLING UNITS IN DESIGNATED SLUM AREA BY CONDITION, TENURE, AND MONTHLY RENT

Tenure and Monthly Rent	Total Units	Condition		
		Standard	Repairable	Not Repairable
Total Units	242	24	85	133
Owner Occupied	57	13	27	17
Vacant	16	1	6	9
Tenant Occupied, Total	169	10	52	107
Less than $2.50	1	—	—	1
$ 2.50- 4.99	9	—	1	8
5.00- 7.49	37	—	4	33
7.50- 9.99	37	—	9	28
10.00-12.49	45	2	18	25
12.50-14.99	8	—	4	4
15.00-17.49	13	3	6	4
17.50-19.99	1	—	—	1
20.00-24.99	2	1	1	—
25.00 and over	16	4	9	3
Median Rent	$10.50	$18.75	$11.00	$8.50

Owner-occupancy was low in the district. Vacancy was high. Owners occupied only 57 of the dwelling units, while 16 were vacant. As would be expected, owner-occupied property tended to be better than average in condition, nearly three-fourths being in good condition or capable of rehabilitation; but 9 out of the 16 vacant units were substandard and beyond repair.

Only 10 occupied rental units were reported to be in standard condition, while 107, or nearly two-thirds, were reported to be so substandard that they were past repair. Standard houses rented for an average rent of $18.75. Houses which could be repaired were rented for $11.00, and non-repairable houses for only $8.50 per month on the average. An entire house that rents for around $2.00 a week must be pretty bad, even in a small, more or less static city such as Danville!

Employment and Income

In order to evaluate properly the employment and income of the population, which needs to be rehoused, it is necessary to consider separately two different groups, with different household composition and different housing needs. These are the true family groups, and the unattached individuals. Of the 202, occupied, substandard units enumerated, 148 were occupied by families and 48 by unattached individuals, the type of household not being reported in the remaining 8 cases.

Families. To get the broad, general picture of family income, the families can again be divided into two groups; those whose primary source of income is private employment; and those who depend primarily on public assistance.

Altogether there were 159 true family groups in the district. Of this number, only 92, or a little more than one-half, had their main income from private employment. Among these families unskilled and semi-skilled labor predominated, particularly in mining, manufacturing, construction, and in commercial enterprises. The miners who live here work in coal mines south of the city. The "manufacturing group" are largely employed in a packing plant in the district, or in the zinc works south of the city. Those employed in commercial enterprises included an assortment of workers; various types of restaurant help, truck drivers for retail and moving concerns, and a few self-employed persons in tavern and other small businesses.

The data on income by type of employment are somewhat distorted in that they present *family* income, rather than the specific income of the breadwinner alone. Nevertheless, the differences are probably indicative of an actual situation. The median income of all families primarily dependent on private employment was $867 per year. Below the average were workers in agriculture, in construction, in public service, and in domestic and personal service; above average were the miners, the factory workers, and the transportation workers (mostly employed in the railroad shops.) (See Table II.)

TABLE II. GAINFULLY EMPLOYED WAGE EARNERS BY TYPE OF EMPLOYMENT AND ANNUAL INCOME OF FAMILY

Type of Industry	Number of Wage Earners	Median Annual Income*
Total	92	$ 867
Transportation, Communication	6	1,200
Mining	9	1,033
Manufacturing	17	910
Trade	20	850
Public Service	4	800
Domestic and Personal Service	4	800
Miscellaneous	17	700
Construction	13	654
Agriculture	2	300

* Family income, from whatever source derived.

In passing, it may be noted that location of employment is an important factor to families with an employed wage earner, even in so small a city as Danville. When the approximate place of employment of the wage earners living in this district had been mapped, the map showed that the bulk of them worked within a few blocks of their home. The exceptions were rather scattered. Apparently even the coal miners, who worked south of the city, had chosen this district for convenience.

In sharp contrast to the families with private employment were the families dependent on public assistance. These families received, on the average, $488 a year, or almost exactly half of the income that a privately employed wage earner received. About half of the families in the public assistance group were dependent on direct relief, with a median income of $437. About a third depended on WPA jobs, which yielded an average of $540. The remainder were older couples, dependent on old age pensions or similar types of assistance whose income was the lowest of the three, averaging $400. (Table III.)

An examination of the schedules returned for the public assistance group led to the conclusion that little change could be expected in their status except as public assistance programs themselves change. To a large extent, the relief group consisted of families in which the breadwinner, while not yet eligible for an old age pension, was, nevertheless, too old for active employment. Likewise, there was a relatively high proportion of broken families, usually a widow, or a divorced woman, both with children. Among those families in which there was an employable breadwinner, he had no skill to offer, and almost invariably, he had the handicap of a large family. No change, of course, was possible in the status of the group receiving pensions. The only group in which betterment might conceivably take place was the WPA group, and here again, the breadwinner was most frequently an unskilled laborer.

Unattached Individuals. There were 76 unattached individuals in the district, of whom 37 occupied separate dwelling units, 25 lived in groups (occupying 9 dwelling units) and 14 roomed or boarded with some family.

TABLE III. FAMILIES RECEIVING PUBLIC ASSISTANCE BY ANNUAL INCOME AND TYPE OF ASSISTANCE

Type of Public Assistance	Number of Families	Median Annual Income
Total	67	$488
Relief	32	437
W. P. A.	19	557
Pensions	16	400

Of the unattached individuals living alone, 15 were men, 22 women. Nine of the men were reported to depend on public assistance, and three were self-supporting. No information was received on the remainder. Practically all of the men for whom income information was available received less than $400. Many of the single women living alone were prostitutes. Their average income was about $700, and few of them were on relief. Information on unattached individuals living in groups, and on lodgers, was too scanty to warrant comment here, except that they tended to follow the pattern laid down above.

The Pattern of Housing Need

In order to depict clearly the housing requirements and the rent–paying ability of the population in this district, it will be helpful to throw the data into a "market analysis" of the sort used by the United States Housing Authority.[2] There are two variables in the analysis. First, housing units of various sizes will be needed to meet the needs of families of various sizes. Second, various rents will be needed to meet the needs of families or unattached individuals with different incomes.

Certain assumptions are necessary in making the analysis. First, it is assumed that no family should pay more than a reasonable proportion, say 20 to 30 percent of its income for rent. The larger the family, the smaller the proportion of its income should be paid for rent. Second, it is assumed that rehousing would entail observance of certain occupancy standards. For example, no one should sleep in a living room and children should not sleep in the same room with their parents. Third,

[2] Now merged with the Federal Public Housing Authority.

it is assumed that families to be rehoused must have an absolute amount of income which is at least sufficient to cover minimum living expenses other than for housing. Conceivably, houses could be given free to low-income families; but there would be little point to providing standard dwellings if the people involved had no money for food or clothing.

The rents and income limits in Table IV are based on these assumptions. Table V distributes the 159 families living in substandard dwelling units according to their eligibility in a rehousing program using the rents and income limits in Table IV.[3]

TABLE IV. ASSUMED RENTS AND INCOME LIMITS FOR ADMISSION TO A HOUSING PROJECT

Classification	Size of Dwelling Unit, by Number of Bedrooms				
	1	2	3	4	5
1. Monthly Gross Rent*					
Grade A.	$13.75	$14.00	$14.25	$14.50	$14.75
Grade B.	16.00	16.50	17.00	17.50	18.00
Grade C.	19.00	19.50	20.00	20.50	21.00
2. Maximum Income Group to be served					
Grade A.	$ 600	$ 650	$ 775	$ 800	$ 825
Grade B.	750	825	950	1150	1150
Grade C.	950	1150	1200	1200	1200

* Including all utilities.

Two points should be carefully observed in Table V—the relative number of families eligible and ineligible for a rehousing program, and the comparative housing conditions of families according to their eligibility. Only 68, or a little less than half of the 142 families studied, would be eligible. Parenthetically, it should be added that 12 of the 68 eligible families were owner occupants, 9 of whom occupied homes that might be repaired. Hence 68 is a generous statement of the market.

Seventy-four, or more than half of the families studied would not be eligible, the reason in six cases out of seven being simply dire poverty.

[3] Eligibility is used here in an economic sense. Legally, the families would all be eligible. Nevertheless, it is questionable whether the lowest income group could or should regularly pay the lowest rent here proposed.

TABLE V. FAMILIES LIVING IN SUBSTANDARD DWELLING UNITS ACCORDING TO ECONOMIC ELIGIBILITY IN A HOUSING PROJECT AND CONDITION OF DWELLING UNIT

Classification	Total	Condition of Dwelling Unit	
		Repairable	Not Repairable
Total families	159	59	100
Eligible, total	68	32	36
Grade A.	20	6	14
Grade B.	24	13	11
Grade C.	24	13	11
Ineligible, total	74	18	56
Income too low	62	11	51
Income too high	12	7	5
Not reported	17	9	8

The comparative housing conditions of the eligible and ineligible families are about what one would expect. Nearly two-thirds of the families living in the repairable substandard houses would be eligible, whereas only one-third of the families living in the non-repairable houses would be eligible. Fifty-one out of sixty-two families ineligible on account of severest poverty were living in the worst type of substandard houses.

The specific housing needs of the eligible families can be briefly summarized. The figures are listed in Table VI. The average dwelling unit in a housing project would consist of 4.6 rooms. On the basis of rent, 20 families would fall in the "A" grade, 24 in the "B" grade, and 24 in the "C" grade. Thus, the average gross rent would be $16.80 per month. On a per room basis, the average cost to the tenant for shelter and utilities would be $3.60 per room per month.

TABLE VI. HOUSING NEEDS OF ECONOMICALLY ELIGIBLE FAMILIES

Number of Bedrooms	Size of Unit	Number of Families
Total	—	68
1	3 rooms	18
2	4½ "	27
3	5½ "	15
4	6½ "	6
5	7½ "	2

The housing needs of the unattached individuals were not subjected to analysis, but they can be deduced in a general way from the data already given.

Conclusions

From the market analysis, it is obvious that any rehousing program, as presently conceived, has sharp limitations in meeting the needs of the people in this slum area. The net effect of a public housing project would only be to thin out the slum. It would reach but a fourth of the occupants of substandard dwellings, and these dwellings would be noticeably the ones in better, rather than poorer condition. Opening the project to unattached individuals would help somewhat, but not sufficiently to alter the general result.

Likewise, to hope for any improvement through the "filtering up" process is to blink at the facts. At the most, only 32 repairable dwelling units would become available from tenants moving to a housing project. For these 32 units there would be upwards of 75 candidates. They would be the candidates who had too little income to be able to get into the housing project. Yet the vacated houses would rent for as much as, or more than the houses in the project. Landlords would be reluctant to drop the rent, and even more reluctant to make repairs at the sime time.

On the other hand, it is questionable whether the project rents should be set any lower. A grade of rents $1.50 to $2.00 lower would perhaps be within the reach of numerous additional tenants. The median income of the group considered ineligible because their incomes were too low was $415. But at that level, it is a moot point whether the rent should be lowered to reach the family at its present income, or whether the real problem is that family income as a whole should be increased.

Certain minor suggestions for increasing family income present themselves in the context of this study, such, for example, as the possibility of some families taking in some unattached individuals as lodgers or boarders. But the problem is too large for any picayune remedies. A bold approach is needed, in part increasing public assistance, and in part increasing employment and raising wages, if genuine slum clearance is to be achieved.

(The points of view expressed in the above article are the personal opinions and observations of the author. They do not reflect the official policies of the Federal Public Housing Authority, nor those of the National Housing Agency.)

SCOTT KEYES
Federal Public Housing Authority

An Index of Housing in Chicago

This research has been reported more fully in the author's unpublished Master's thesis, "An Index of the Physical Quality of Dwelling Units in Chicago Residential Areas" (Department of Sociology, University of Chicago, 1942). The methods of analysis outlined here may also be considered as a sequel or possibly an alternative to the technique already developed by the staff of the Chicago Plan Commission.[1]

THIS study sought a method by which real property inventory data could be summarized as an index, or a rating scale, that would measure the physical quality of the dwellings in any given urban residential area. More specifically, the data of the 1939 Chicago Land Use Survey were taken as typical of other real property inventories, and the problem was confined to rating Chicago residential areas.

It early became apparent to the author that the character of the index should be shaped largely by the criteria that it was to meet. The following criteria were established: (1) that the index be confined to one aspect of housing,—namely, the physical quality of dwelling units in specific urban residential areas,—and that within this aspect it should represent in correct

[1] Cf. Robert C. Klove, "A Technique for Delimiting Chicago's Blighted Areas," *The Journal of Land & Public Utility Economics*, November, 1941, pp. 483-4. Also, the coincidence of factors technique proposed by Dr. Homer Hoyt in *The Structure and Growth of Residential Neighborhoods in American Cities*, Federal Housing Administration, Government Printing Office, Washington: 1939, pp. 47-48.

proportions those elements of housing deemed to constitute that aspect; (2) that the index be expressed as quantitative values relative to some average or standard; (3) that the index be as sensitive as possible to the complete range of housing quality; (4) that the technique be generally applicable to any area covered by a real property inventory; (5) that the index be valid when checked by field visits; and (6) that the index strive to balance simplicity of construction and full use of available pertinent data. The manner in which, and the extent to which the final index satisfies these criteria are indicated below, following a cursory description of the index itself.

Four factors, all enumerated in the Chicago Land Use Survey, are used in the index:

1. Percent of dwelling units physically substandard (given a weight of two in the index). To qualify as physically substandard a dwelling unit must fall into one or more of the following categories: (a) have its structure unfit for use or in need of major repairs; (b) lack private toilet or bath; (c) lack centrally installed heating equipment; or (d) lack electric or gas lighting equipment.
2. Median-year-built group of residential structures (given a weight of two).
3. Percent of dwelling units in structures that are in poor condition, that is, in need of major repairs or unfit for use (given a weight of one).
4. Percent of dwelling units in structures that are in good condition (given a weight of one).

These four factors are available in tabulations on block, census-tract, quarter-square-mile, and community-area bases in Chicago. The second and third factors are listed in the desired form; the first and fourth require the simple computation of percentages.

Because the age factor is not on a percentage basis at all and the remaining three percentage factors vary in relative meaning, there is no direct way to combine the measures into one average measure. For example, one of the sample blocks studied had the following values for the four factors:

Percent of dwelling units physically substandard	32.1
Median-year-built group	1895-1904
Percent of dwelling units in poor condition	23.5
Percent of dwelling units in good condition	13.6[2]

To total or to average these values would be misleading. The median-year-built value would have to be converted to a 0-100 range. Each of the three percentage values would also have to be adjusted to account for its relative variation from the average or normal percentage for that factor.

To make these adjustments, a statistical device known as the standard score or Z-value technique was employed. The arithmetic means and the standard deviations of each of the four factors were computed for 883 residential census tracts in Chicago. Next, a conversion scale was constructed, using 0 to represent the class of values falling immediately around the arithmetic mean and allowing 1 point for each .25 standard deviation above or below that mean. These new values are termed Z-values. (Strictly speaking, 1 Z-value usually equals 1 standard deviation. In the conversion scale used in this index, 1 Z-value has been taken as equal to .25 standard deviation in order to obtain a more sensitive index value.) This conversion scale represents the crux of the index and is shown as Table I.

Using the same sample block as above, the original values are found in the conversion table and new Z-values are obtained as shown here:

Factor	Original Value	New Z-Value
Percent of dwelling units physically substandard	32.1	−1
Median-year-built group	1895-1904	−1
Percent of dwelling units in poor condition	23.5	−3
Percent of dwelling units in good condition	13.6	−4

[2] The 13.6 percentage of dwelling units in good condition must be treated differently from the percentages for the first and third factors. For the latter factors, the higher the percentage the poorer is the quality; for the good condition factor, the higher the percentage the better is the quality. This is accounted for in the final index by changing the signs of the good condition values, so that a high percentage has a high value and a low percentage a low value, the exact opposite of the first and third factors' scoring.

TABLE I. SCALES FOR CONVERTING ORIGINAL VALUES OF CHICAGO LAND USE SURVEY FACTORS TO Z-VALUES USED IN INDEX

Per Cent of Dwelling Units Physically Substandard		Median-Year-Built Group of Residential Structures		Per Cent of Dwelling Units in Structures in Poor Condition		Per Cent of Dwelling Units in Structures in Good Condition	
L.U.S. Value	Index Z-Value	L.U.S. Value Before	Index Z-Value	L.U.S. Value	Index Z-Value	Value L.U.S.	Z-Value Index
.0- 2.6	4	1885	−7	.0- 1.6	3	0- 8.2	−5
2.7- 8.7	3			1.7- 5.3	2	8.3- 15.4	−4
8.8- 14.7	2	1885-		5.4- 9.0	1	15.5- 22.8	−3
14.8- 20.7	1	1894	−4	9.1- 12.7	0	22.9- 30.3	−2
20.8- 26.7	0			12.8- 16.5	−1	30.4- 37.7	−1
26.8- 32.8	−1	1895-		16.6- 20.2	−2	37.8- 45.2	0
32.9- 38.8	−2	1904	−1	20.3- 23.9	−3	45.3- 52.6	1
38.9- 44.8	−3			24.0- 27.6	−4	52.7- 60.1	2
44.9- 50.9	−4	1905-		27.7- 31.4	−5	60.2- 67.5	3
51.0- 56.9	−5	1914	2	31.5- 35.1	−6	67.6- 75.0	4
57.0- 62.9	−6			35.2- 38.8	−7	75.1- 82.4	5
63.0- 68.9	−7	1915-		38.9- 42.5	−8	82.5- 89.9	6
69.0- 75.0	−8	1919	4	42.6- 46.2	−9	90.0- 97.3	7
75.1- 81.0	−9			46.3- 50.0	−10	97.4-100	8
81.1- 87.0	−10	1920-		50.1- 53.7	−11		
87.1- 93.0	−11	1924	6	53.8- 57.4	−12		
93.1-100	−12			57.5- 61.1	−13		
		1925-		61.2- 64.9	−14		
		1929	7	65.0- 68.6	−15		
				68.7- 72.3	−16		
		1930-		72.4- 76.0	−17		
		1934	9	76.1- 79.8	−18		
				79.9- 83.5	−19		
		1935-		83.6- 87.2	−20		
		1939	10	87.3- 90.9	−21		
				91.0- 94.6	−22		
				94.7- 98.4	−23		
				98.5-100	−24		

In this form the new Z-values can be added meaningfully.

It was indicated above that the first two measures received double weight in the index. The mechanical procedure for this is to set down each of these first two Z-values in duplicate. Thus, for the above sample block, we have:

-1 -1 -1 -1 -3 -4

Then, since the author's investigation showed certain chances of error in individual measures pulling the total too low, the lowest Z-value was consistently eliminated.[3] In the above case, then, the -4 is eliminated and the remaining five values give a total of -7 as the index value or rating for the block. By putting down the first two values in duplicate, one of them can easily be crossed out if it happens to be the lowest Z-values.

In this form the index has a range from +36 to -43, from highest to lowest quality housing. Dropping the lowest Z-value raises the average index value to about +4. The author has found that these arbitrary classes are convenient for use in rough interpretation of the index values:

Index values from +16 to +36	Good quality
Index values from + 5 to +15	Above average quality
Index values from −15 to + 4	Below average quality
Index values from −43 to −16	Poor quality

Within these classes, of course, the index values are sensitive to finer distinctions in quality.

[3] One of the sample blocks studied offered an extreme example of this. The Z-values for this block were:

4 4 7 7 3 −5

Using all of these values gave an unrealistically low total of 20 out of a possible 39. Elimination of the −5 gave a much more accurate rating of 25 out of a possible 36.

The merits and shortcomings of the index can be described in the light of the six criteria that were to be satisfied, as listed at the outset.

First, it has been judged that the index measures certain desired features fairly closely. Desirable weights for these features were obtained from analysis of already developed rating scales,—scales that depended on more extensive enumeration of housing features than did the real property inventories. The originally desired weightings, the weightings approximately obtained, and the extent of the over- or underemphasis of the index weightings are indicated in Table II.

TABLE II. EXTENT TO WHICH WEIGHTING OF INDEX CORRESPONDS TO WEIGHTING ORIGINALLY DESIRED

Measures	Weighting of Each Feature Included in Physical Quality of Dwelling Units					
	Equipment and Facilities	Condition of Structure	Adequacy of Light and Air	Room Arrangement	Architectural Attractiveness	Total
As desired	40	25	15	10	10	100
As obtained in index	28	29	10	4	29	100
Over- or under-weighting in index	−12	+4	−5	−6	+19	—

It will be noted that equipment and facilities are underemphasized and that age and architectural attractiveness are overemphasized. These divergencies arose largely from the character of the available Land Use Survey data, there being a lack of enumerated facilities and an inference of age and attractiveness of structures in certain of the condition measures.

Second, the index has been expressed as quantitative values relative to average housing conditions in Chicago. This has considerable value for statistical manipulation and for summary comparison of various residential areas.

Third, the index is very sensitive to low quality housing, fairly sensitive to medium quality housing, and only generally sensitive to high quality housing. Above a certain point the index fails to differentiate quality. The factor of rental should probably be introduced for differentiating high quality housing. Because the author felt that rental introduced locational, neighborhood facility, social prestige, and other values that were extraneous to the particular type of quality he wished to measure, he steered clear of rental as a factor. But for general usage, the index would probably be more valuable if it included rental, particularly emphasizing high rentals.

Fourth, the technique is generally applicable to any city covered by a real property inventory. In fact, certain inventories and the 1940 United States housing census will probably afford a greater availability of data than did the Chicago survey. New Z-values will have to be worked out for each locality, however, unless Z-values are developed on a nation-wide basis. The author would recommend that certain data be made more generally available, especially regarding facilities. It would also be desirable to have the age of residential structures provided on a dwelling-unit basis as well as or instead of on a structure basis.

Fifth, on the basis of field checks on 75 sample Chicago blocks the author established a correlation ration of .87 with a standard error of .03. This correlation ratio squared is .76, the proportion of the total variance of field check ratings that is accounted for by the index. Also studied in the field were two medium-quality housing areas, checks being made at those spots where the index seemed to offer unrealistic values. The final weighting and the decision to drop the lowest Z-value resulted from the field studies, as well as from the attempt to obtain proportionate representation of the desired factors, as indicated in Table II.

Sixth, the index proved to be somewhat cumbersome in its mechanics. Even disregarding the exploratory nature of the present study, the time taken in carrying out the conversion of original values to Z-values was considerable. And, unfortunately, certain essential data were not available on a block or a census-tract basis. This is probably also true for many other real property inventories, but may be overcome for most of the larger cities when 1940 housing census tabulations are released.

On the whole, the author was somewhat disappointed in the reliability afforded by the index. Although he feels the study was a careful attempt to develop an objective

rating scale of housing quality, the results did not entirely justify the time involved in carrying out the mechanics of the index. For other than statistical manipulation purposes, actual field visits probably afford more rapid and fairly reliable ratings, at least of the external condition of housing. Certainly index values obtained by this technique should be checked by field visits. Perhaps the combined use of both will prove fruitful.

As a source of single, summary, objective index values, the technique deserves consideration. Other housing analysts might also explore the possibilities inherent in the index construction decribed,—the reduction of all constituent factors to standard score or Z-values for subsequent combination into the final index value.

DONALD L. FOLEY

Research Assistant
Chicago Plan Commission

Land Resources Department

Problems of Range Land Tenure

IN the Great Plains region, problems of tenure are the major problems of land economics. It is generally recognized that tenure in the West differs from the traditional norm. A host of studies has emphasized such abnormalities as extensive public land ownership, tax delinquency, a "new public domain" of tax-reverted land, inflated land values and excessive land charges, checkerboard patterns of land ownership, diversity of land management policies, multiplicity of ownership, and a relatively small proportion of owner-operation. These maladjustments, however, are not problems. They are merely facts characterizing the tenure system in range areas.

The real problems of range land tenure are encountered when individual stockmen, private landowners, and guardians of social interests try to perform their functions under conditions imposed by the institutional environment. Some of those problems are suggested in the following paragraphs.

Tenure Problems of the Stockman

The tenure system frequently does not provide the reasonable security of control that is required for successful ranch operations. Livestock production is a long-term enterprise and control of range is an essential element of production. When the tenure system does not provide some assurance that private operators will have access to grazing lands in succeeding years, stockmen cannot expand and develop their enterprises. Introduction of uncertainties into the tenure situation results in restricted livestock production.

Excessive cost of grazing land to the individual operator is an important cause of unstable tenure. Whether the stockman pays taxes and interest as an owner or pays rentals as a lessee, land charges in many cases are greater than the productive value of the land. Under such circumstances, the operator is in an untenable economic position and must sooner or later lose control of the land. Overvaluation of grazing land is partially due to misconceptions of proper use and the fact that some grazing land is considered potential farm land. Another source of difficulty is the great inequality in valuation of different tracts and different resources. The benefits of low-cost grazing on public lands, for instance, tend to be capitalized in private property with grazing preferences. Stockmen frequently compete among themselves for control of strategic tracts, water holes, and base properties. These factors will work toward inequitable and excessive land values which are often aggravated by high interest charges and the extreme tax rates of overexpanded local government. Individual stockmen often find themselves forced to pay more for control than the use of the land is worth.

Not only is the general level of land charges high; but taxes, interest, and rentals are relatively fixed while returns from livestock production are highly variable. As a consequence, operating capital is subject to recurrent pressure that is reflected in exploitative range use and in the practice of abandoning leases and not paying taxes in bad years.

A lack of correspondence between the pattern of operating units and ownership tracts contributes to the instability of operating control. Land ownership is so broken up that a typical ranch often includes tracts owned by several different landowners. The ownership tracts are not complete livestock units; they are unrelated except from the operator's viewpoint. His is the task of organizing an operating unit of several tracts leased at varying rentals for different periods and possibly used under a variety of restrictions. Such a ranch enterprise may be disrupted at any time by the failure to deal with a single landlord who controls a strategic tract.

Difficulties arising from multiple ownership are augmented because absentee owners are widely scattered. It is not unusual

to find land ownership within a single township divided among the residents of a dozen states. Absentee owners of land in the region are far away from their land,—both geographically and psychologically,—and the difficulties of dealing directly with them are a serious obstacle for the indivdual operator.

Full use of the range usually depends upon such improvements as fences, corrals, and small water facilities, but short-term expectations of tenure discourage developmental work. Because ranchers fear leases may not be renewed or rentals may be increased, they often confine improvement work to personally-owned base properties, and the development of absentee-owned land is kept at a minimum.

A short-time attitude toward tenure also reacts unfavorably on range conservation. Expensive practices; for example, reseeding of abandoned farm lands, are not economically feasible for the operator with short-term control. Unrelieved competition for range furthermore reacts to prevent conservative utilization. When an operator feels that a good stand of grass is an open invitation to competitive bidding for leases, he must keep the grass close-cropped. Under such conditions the stockman views an effort to restore grazing capacity through limited use not only as a postponement of current income but as a possible cause of complete loss of control.

Tenure Problems of Private Landowners

Most of the problems confronting private landowners in the range area come from the high price paid for ownership in comparision with the low returns from it. Grazing land values have been influenced unduly by competition for land, unusually favorable weather during the period of settlement, and over-enthusiastic estimates of farming possibilities. Experiences in actual use of land have tended to reduce market values to a point well below the book values of investment, and landowners are faced with the prospect of abandoning the land or continuing to pay high current charges in the hope that market conditions will be more favorable in the future.

Property taxes are the major costs of land ownership in the Great Plains. Units of local government are under a continuous pressure for revenue, and the reduction of the tax base through delinquency and reversion has resulted in a corresponding increase in the tax rates imposed upon taxpaying lands. Landowners, as a consequence, are paying taxes not only on the basis of high assessed values but at relatively high rates.

When a landowner operates his own land, he often finds that taxes and interest exceed normal returns from the land in production. His problems are those of an operator who must pay too much for control of the land, and he has no opportunity to shift the burden of costs by bargaining. As a means of adjustment, owner-operators usually resort to exploitation of land resources and diversion of a disproportionate share of gross income to land, but such efforts merely postpone recognition of irreconcilable difficulties.

When a landowner leases his land to a stockman, the terms are fixed by bargaining and the rental may or may not cover the taxes and interest charges. If the tract is of such strategic importance that stockmen compete for it among themselves, the burden of a high fixed cost may be passed along to the operator. The landowner is still in a precarious position, however, because land cannot bear excessive costs indefinitely even under exploitative use.

In the majority of cases, the landowner is at a disadvantage in bargaining and must accept what returns he can get, regardless of investments in the land. The fact that grazing land is sometimes rented for the amount of taxes or a portion thereof reveals that landowners may accept a position, knowing that it cannot be maintained except for a short time. When rentals do not satisfy the owner's claims, there is relatively little opportunity to withhold leases in protest. The tradition of free range in the West is still firmly established, and lands owned by non-residents are frequently used without legal control. There are very few fences because the cost of fencing per acre exceeds the value of the land except where a much larger acreage than that held by the usual absentee owner can be fenced in a compact block. Because the costs of policing low-value lands and prosecuting trespass are excessive, absentee owners sometimes find it virtually impossible

to make stockmen pay for grass taken by trespassing livestock even when the facts of continuous trespass are known.

Landowners have few opportunities to supervise use of their lands, and land is generally used without any restrictions unless it happens to be located within a grazing district which enforces a range management program. For this reason, absentee-owned land is often abused, and one of the effects of depletion is to reduce the value of the owner's equity.

The high cost of ownership and the low productive value of grazing land create an incompatible relationship. The burden may be forced on either the landowner or the livestock operator, depending on their relative bargaining powers, but it is obvious that, under the cost relationships that have existed, someone must bear a destructive burden. In general, absentee landowners are in a particularly unenviable position, because policies of local government, operating practices, and public programs tend to support the interest of stockmen and society in general at the expense of absentee landlords. There appears to be general acceptance of the belief that as long as someone must be a victim of unavoidable circumstances, the non-resident landowner is the most logical choice.

Tenure Problems from the Social Viewpoint

The importance of production in the tremendous war efforts of this nation gives immediate social significance to tenure problems that handicap livestock production. Although the exact relationship between grazing land tenure and the flow of livestock to the markets cannot be evaluated in terms of production, it is obvious that control of land is essential to livestock operations and that the terms and costs of control must be compatible with the other aspects of production. The tenure system in grazing areas does not always satisfy these conditions, and uncertainties in the tenure situation become obstacles to the attainment of production goals. At present, the greatest problem of grazing land tenure, from the social viewpoint, is its adverse effect on livestock production.

Society as a whole is also affected by an unstable population that cannot become established under a system of sustained individual enterprises. Tenure problems, reflected in the condition of the livestock industry, may affect the welfare of a whole class of society, endangering family incomes and standards of living. The reality of such possibilities is recognized by the Farm Security Administration which is now sponsoring various tenure improvement experiments throughout the Northern Great Plains.

Public services have suffered or have been imperiled by a tenure system which does not provide adequate public revenues. Local units of government have had great difficulty in administering a property tax that will, over a period of years, provide the income necessary for schools and roads without interfering seriously with private rights in the land. Bankrupt county governments and wholesale tax delinquency are evidence that this social problem has not been solved. The breakdown of private ownership in some areas and the substitution of new forms of public ownership have given rise to new problems of establishing operating tenure and have involved fundamental changes in the relation of the public to land and land-users.

Social interests in the conservation of natural resources—both public and private—have focused attention on tenure problems that result in exploitative practices and the depletion of range resources. When uncertain tenure prevents an individual stockman from adopting conservative management practices, social interests are affected even though the actual transaction involves only private landowners and operators. One of the main aspects of recent public programs for land use adjustments has been to bring land under forms of control which do not handicap conservation.

Tenure difficulties often interfere with such public affairs as the administration of publicly owned range lands. An important objective of public land administration in recent years has been to tie public land to the private land with which it is most effectively utilized, and one of the difficulties at present is the lack of a tenure system under which the use of private and public lands can be correlated.

Other public programs are also affected adversely by existing tenure conditions. The development of small water facilities

on private land, for instance, is impeded by a lack of the control necessary to make such developments feasible from the operator's point of view. Transition from a cash-crop economy to diversified farm-ranch enterprises is hampered by a system that prevents operators from blocking out adequate units. Range management practices of restricted grazing and extensive use cannot be justified economically when land charges are based on potential farming uses.

Tenure Problems in Relation to Planning

The main purpose of this paper is to emphasize the distinction between the problems and the institutional characteristics of grazing land tenure. The distinction is of utmost importance in the planning process because it is reflected in the method of attack on tenure problems.

Tenure problems arise when land is put to use under the specific conditions of ownership, costs, and operating requirements prevailing in the area. Often the difficulties encountered by stockmen and landowners can be traced directly to characteristics of the tenure system, but this fact must be established by careful analysis. The tenure system is a complex of variables, and *a priori* assumptions of cause-and-effect relationships often are not borne out by the facts.

In the Northern Great Plains, for instance, only a small proportion of the land, —less than a third,—is owned by the operators, and this characteristic contrasts markedly with the traditional goal of having every man on his own farm. There is no justification, however, for assuming that the scarcity in owner-operation is responsible for such problems as unstable operating tenure, an untenable cost situation for the private landowner, and diminished production of the livestock which the nation needs to help win the war. There may be a correlation, but facts may prove the relationship so tenuous as to be insignificant in a program of adjustment.

One of the dangers of identifying tenure problems with characteristics of the tenure system is that the "obvious" adjustments may not have the desired effect. Burdensome property taxes, for instances, are a problem from the landowners' viewpoint. High taxes are often associated with a situation in which assessed values are disproportionately high. It might seem that the landowners would be relieved if their property were re-assessed at more reasonable levels. A reduction of land values to correspond with productivity, however, would probably mean only that units of local government would be forced to impose correspondingly higher tax rates on the reduced tax base, and the net result would have no particular advantages for the landowner.

Planning for the improvement of grazing land tenure should start with problems of tenure rather than with the tenure system itself,—that is, the most direct approach is functional rather than structural. A comparative pattern for an ideal tenure system doubtless has some value, but it has much less real and immediate significance in the Great Plains region than a plan or a series of plans for removing frictions in the existing system.

The problem approach has the value of enabling planners to concentrate on limiting factors rather than embarking on a general revision of a whole system. A gradual evolutionary charge is less disturbing to a society than a frontal attack on established institutions, even assuming that our present knowledge is adequate to plan a satisfactory substitute for the displaced system. Moreover, problems can be evaluated by the basis of urgency, and a system of priorities established. Limitations of time and money demand that present efforts of planners and technicians be directed where they are most needed and most effective.

CHARLES W. LOOMER

Bureau of Agricultural Economics
U. S. Dept. of Agriculture
Lincoln, Nebraska

The Partido System

A SYSTEM of livestock tenancy which is unique among agricultural institutions in the United States exists in northern New Mexico and parts of adjoining states. Although various forms of livestock tenancy are common throughout much of the country, the "partido" system is restricted largely by the Spanish-American sheepmen of the Southwest and is a peculiar adaptation to the historical, human, physical and institutional environment of that area.

"Partido", Spanish for "party", refers in this case to parties to a rental contract who are the "patron", or owner, and the "partidario", or operator. The patron performs much the same function in the relationship to the partidario as the Southern plantation owner does to the sharecropper. Although individual circumstances vary considerably, the patron usually owns a wool and livestock brokerage business, a general merchandise store, range land, and interests in financial institutions, in addition to the sheep which he rents. The patron normally furnishes supplies and credit to the partidario who settles his accounts each summer or fall when the lambs and wool are marketed. A typical partidario, unlike a Southern sharecropper, owns a small tract of irrigated farm land and several hundred ewes. He will rent 600 to 800 ewes from a patron, mortgaging his own sheep for security, and thus have a desirable sized sheep unit. If the patron has suitable range he will lease to his partidarios. If not, he will help them to lease other private or state land or to obtain grazing privileges on federal land.

The partido system is not very widespread, for it is estimated that the total operation of the more important outfits involves less than 200,000 sheep and only a few thousand goats and cattle. One or two of the larger outfits own between 30,000 and 40,000 sheep but an outfit of 10,000 is more common. The partido operators probably own and control something less than 2,000,000 acres of range. Some additional land is owned or controlled by the partidarios but this acreage undoubtedly is small, for the partidarios enter into the rental contract largely because they need more range.

The partidario usually has a written contract with his patron, which, according to New Mexico law (Sec. 4-312, 1923), must be filed in the same manner as chattel mortgages. Nevertheless, sheep received under contract still belong to the patron (1929 N. Mex. code, Sec. 4-316). Some similarity to mortgages does exist because sheep are transferred by written contract, an annual charge is made, and, at the termination of the contract, the same number and kind of sheep must be returned to the patron. "Interest" and "principle", however, are paid in kind rather than in dollars.

Although individual contracts vary somewhat in their terms, the usual arrangement requires that the partidario pay the patron 20 smooth wether lambs annually for each 100 ewes rented. Lambs must average not less than 55 pounds after all those under 50 pounds have been culled, and must be delivered, f.o.b., at a specified shipping point on or before a given date, usually November 1. The partidario receives all the remaining lambs and the wool for his share in the enterprise.

If the renter cannot deliver the rented sheep at the termination of the contract, the owner has the option of requiring payment of market price for those not delivered, plus a dollar per head as "liquidated damages", or of selecting, from the renter's own sheep, three head of the same age and quality for each two head not delivered. Regardless of circumstances, the partidario must return the same number and quality of sheep rented or suffer the penalties provided in the contract.

A typical contract provides:

". . . that there shall be no release or excuse from whatsoever cause for not re-delivering the said sheep of the quality, class and number, as above stated, either by reason of death, sickness, lightning, hail, drouth, pestilence or war, or any of the actions of the elements, and the renter to this intent, hereby becomes an insurer of such delivery of the property."

Such a clause as this sometimes works a great hardship on the partidario. He mortgages his own sheep as security for those rented. Consequently, when serious mishaps occur, as they unavoidably do at times to a band of sheep, he may lose not only

the rented sheep but his own stock, his land, or other possessions as well. Sheepmen in the West continually must bear the risk of heavy losses of stock from bad weather, epidemics of disease and other causes, but seldom are their entire resources subject to such risks. Seldom is the ordinary renter required to insure rented property against the caprices of the elements under any other owner-tenant relationship. Under the partido system, however, the heaviest burden of risk is placed on the party least able to bear it. The principal risk borne by the patron is that arising from price fluctuations.

The partidario may not sell or dispose of the rented sheep, their wool, or their increase without the consent of the patron. Thus a partidario is not permitted to eat one of his own lambs, produced by the rented ewes, without the patron's consent. Further, and more important, the patron usually requires his renters to market all wool and lambs through him. In some places the patron owns and operates the only feasible market outlets, although in many instances alternative markets are available. The rental contract serves as an option on the wool and lambs produced, thus forcing the partidario to patronize the owner's livestock and wool business. Under this system, the patron can deduct amounts that may be owed to him by his partidarios. The partidario may dispose of his products elsewhere only if the patron fails or refuses to pay a "fair market price" for the lambs and wool after written notice or demand. It is questionable how well informed the usual partidario is about the "fair market price". Moreover, what patron would permit his partidario's products to be sold elsewhere when they all owe him money?

If a patron chooses, he may terminate a contract before the expiration date for any one of a number of causes. Failure to care for sheep as a "prudent sheepman", failure to use good bucks, failure to change bucks every two years, failure to maintain a sufficient number of sheep of the age and kind rented to repay the owner, failure to perform specified agreements, or death of the renter may be sufficient cause for termination of the contract. On termination, the rented sheep must be delivered to the owner, either on the range or at a specified place at the option of the owner. Termination of the contract does not necessarily discharge all obligation of the partidario to his patron. The patron still may bring action to collect any unsatisfied debts.

The partido system depends for its success upon a combination of several conditions. The partidario must have a small band of sheep for which he needs range. The patron leases range to him or helps him secure range rights and rents to him enough additional sheep to make up an efficient sized band. The partidario must have credit. The patron extends credit, usually in the form of merchandise from his general store. To assure repayment, and as an additional source of revenue, the patron operates a wool and livestock business through which the partidario must deal. The partido system does fill an important need, but the patron is in an extremely advantageous position for his renters must insure his property and must both buy and sell through his business.

M. L. UPCHURCH

Bureau of Agricultural Economics
U. S. Department of Agriculture

A Dilemma of Land Use

MANY studies originating with state universities and the United States Department of Agriculture have been devoted to classifying land for farming or other uses. Programs of land use for the areas studied have been suggested with the economic security of the rural population in mind. In view of these programs, it is alarming to discover the efforts of private owners to dispose of land delineated as submarginal or unsuited to settlement. For purposes of illustration, the author has brought together quotations from an Experiment Station bulletin and a publication of a corporation which owns a majority of the land included in the study reported by the Experiment Station.

It is not proposed to question the policy of the corporation, but merely to present what is obviously a direct retardation of the national agricultural planning effort. Imagination is not required to visualize the great loss of time, energy, and resources when such counter-forces meet on the field of economic utilization of rural land. For what it is worth, then, these points of view on land-use are presented. One is by a technician, who is an employee of the public; the other is by a sales organization of a private land owning corporation. May we call attention to the fact that the writers of the sales booklet have taken painstaking care to avoid direct misstatements. However, significant differences in the two publications are apparent in the quotations which follow in parallel columns.

LAND OWNING CORPORATION BOOKLET	EXPERIMENT STATION BULLETIN
A beautifully decorated 48-page publication with one or more pictures on every page.	*The conventional black and white Experiment Station Bulletin with four pictures supplementing the graphic illustrations.*
Settlement	
"We will make it easy for you to look the country over thoroughly. . . . Remember, the new country, where the big development is just beginning to disclose its wealth of resources, is the place for the thrifty and far-seeing man to get a foothold and invest while prices are low and competition small."	"The cut-over lands of the parish are not adapted to general settlement in small farms. Unguided settlement will not only destroy much of the present source of income for many of those who now depend on farming, but also bring disappointment to many of those who try to establish farm homes on unsound land-use basis."
Land Values	
"Land is Low in Price The Lands comprising .... have great advantages of crop production, owing to the long season and diversity of crops."	"Local farmers recognize that most of the cut-over land has little, if any value per acre for surface production. "The price of cut-over land is above its present productive value for farming purposes."
Farming Country	
"A Natural Farming Country . . . . Large areas of land were cleared of trees, and these extensive tracts of open, rolling country, reaching out for many miles in almost all directions from the towns and cities, heavily covered with forage grasses, remind you, as you drive on through the country, of the prairie lands of Central and Western Iowa, as they looked before they were cut up into farms . . . . . The native grass is heavy and luxuriant over the entire region and, as many northern farmers have stated, the entire ..... look as if it had been especially made for an agricultural and grazing country."	"The problem area map of Louisiana shows all except a strip of land along the northern part of the parish as an area where 20 percent or more of the farms are marginal or submarginal and should be replaced by forests or grazing."

Soils

"When you have seen these proofs in the ....., proofs that will convince you of the productivity of our soils . . . . . "

"The soils of ..... are generally low in productivity. Even the better grades of upland soils are deficient in the available mineral elements, especially phosphorus, required for plant growth . . . . . Farmers frequently commented that the fertility needed in the soil for the production of cultivated crops must be added by means of commercial fertilizer, cover crops, and barnyard manure in order to obtain fair yields. Unlike some areas of low productivity, this area does not give a flash of good yields when first broken, but must be fertilized from the beginning."

Corn

"The fact that the ..... is adapted to corn growing appeals to the Northern farmer. Corn is a crop he knows,—knows its great value as a feed for every variety of livestock; knows its habits of growth; knows how to plant and tend it; knows the soil required to produce it. When the farmer of any of the grain growing sections of the North learns that these lands will raise corn, he has no fears as to his ability to grow other crops that have places of importance in diversified farming."

"Corn was produced on 196 of the 205 farms, with an average of 11 acres and a range of from one-half to 45 acres per farm. The average yield of corn was 15.4 bushels per acre, which is slightly below the state average yield of 16.5 bushels per acre for the same year . . . . The yields on individual farms ranged from as low as 2 bushels per acre to as high as 37 bushels per acre.

For those farms using commercial fertilizer, the average amount applied was 196 pounds, with a range on individual farms of from 18 pounds to 500 pounds per acre. The average cost of fertilizer per acre was $3.17 and range from as low as 30c to as high as $8.50. The cost of fertilizer per bushel of corn produced averaged 20c and varied on individual farms from 3c to 82c."

Livestock and Range

"Fortunes have been made in the livestock business in the ..... Much of this wealth was acquired in the raising of range cattle, requiring little attention on the part of their owners, who grazed them on the range which was open and free."

"It is estimated that under present conditions 3.7 acres of unimproved cut-over grazing land are required per head of sheep and 12 acres per head of cattle. This estimate include the range required for the young animals produced and sold in less than 10 months. . . . It seems fairly certain that free range will not be continued indefinitely and access to range land may also be taken from local farmers by the enclosure of large holdings."

Satsuma Oranges

"It has been demonstrated that the soil and climate of the ..... is especially adapted to Satsumas and is responsible for the size, flavor and superior quality of fruit. Trees usually bear a money crop three years after setting out. They have been known to withstand a temperature of 17 degrees above zero (rarely if ever experienced in the .....) without injury."

"By 1939 the local farmers were convinced that Satsuma oranges were not a profitable commercial crop owing to winter freezing causing frequent crop failures."

Development and Utilization

"Picture in your mind's eye a wide expanse of open country, gently rolling, but without high or broken hills or low, boggy areas; a broad, billowy, undulating surface, intersperced with dry runs or "draws", with an occasional stream following the center of the water sheds. The course of the stream is usually amphasized by a heavy growth of hardwood timber, forming a narrow strip along its banks. There are no other trees on the land except at rare intervals a slender pine that was too small to attract the lumber operators; or an occasional miniature group of these three, forming a tiny grove of a half acre or so in extent, and suggesting an attractive site for dwelling house and farm buildings. There is practically no undergrowth on these farm lands,—the brushy undergrowth and ground pine frequently spring up on cleared lands in Northern States are not here at all. . . . . Everywhere the ground is covered with a heavy growth of wild grasses and flowers, varying in height and luxuriance with the season of the year. Except for the presence of the stumps, this land resembles in topography and general appearance the open rolling prairie farm country in Missouri or Iowa.

"One of the important means for preserving a reasonable balance between land resources and farm families for the years to come would be to zone a portion of the parish against additional residence settlement. An area containing 300,220 acres has been mapped as land that should have its surface use restricted by means of a parish rural zoning ordinance. The proposed restricted use area could be increased to 400,000 acres with desirable results."

On the one hand, we have the research report of a land economist, working in the interest of the public, recommending restriction of the area for settlement. On the other side, we have the skillful journalism of advertisers, backed by the profit incentive, encouraging settlement on small tracts.

What are the social and economic implications? Why should we as citizens and land economists, concerned with the best use and conservation of both soil and human resources, reconnoiter these clashing interests? The answer is apparent when we contemplate the scope of acreage, man-hours, dollars and energy invested and lost. A reasonable estimate of lost hopes and lost human energy brought about by serious-minded people acting on biased information is difficult to obtain, but it is known that if the government (local, state, or federal) would purchase or zone the submarginal holdings, many evil features of uneconomic development would be eliminated. The ultimate expenditures of local, state, and national governments for relief and service to families settling areas not able to support them might easily equal the cost of the land. At any rate, and for what it is worth, may we point out that here appears a dilemma of economic utilization of land resources.

ALVIN L. BERTRAND

Instructor and Research Assistant
Department of Agricultural Economics
Louisiana State University

Public Utilities Department

Price Regulation and the Public Utility Concept: Olsen V. Nebraska

THE price fixing and regulatory powers of the states, and the new position being taken by the courts on those matters was further clarified by the United States Supreme Court during 1941 in Olsen v. Nebraska.[1] This case involved the regulation of the rates charged by an employment agency, but the decision gave the public utility concept a knockout blow.

The state of Nebraska passed an act in 1929 providing for the licensing and fixing of maximum compensation to be charged by private employment agencies.[2] The Nebraska Secretary of Labor was assigned the task of administration.

An employment agency sought a license to operate but refused to limit its maximum compensation to ten percent of the first month's salary or wages of the person for whom employment was secured, as provided in the law. The constitutionality of the statute relative to the limitation upon fees charged was questioned, and the state supreme court subsequently held it to be unconstitutional under the Fourteenth Amendment to the U. S. Constitution. The state court also relied heavily upon an earlier decision made by the United States Supreme Court in dealing with the regulation of employment agencies in New Jersey.[3]

The Secretary of Labor appealed the case to the United States Supreme Court, maintaining that the business of a private employment agency is vitally "affected with a public interest" and subject to regulation under the police power of the state. The United States Supreme Court overruled the Nebraska Supreme Court, stating that there was no violation of the Fourteenth Amendment and that the older Ribnik decision was no longer controlling authority. In that case employment agencies were declared not to be subject to regulation because they did not have the characteristics which were essential to businesses "affected with a public interest." The Court now pointed out, as did Mr. Justice Holmes in a dissent in the Ribnik case, that the concept of "affected with a public interest" as a criteria for regulation is little more than a legal fiction. The Court further stated, "We are not concerned with the wisdom, need, or appropriateness of the legislation . . . . There is no necessity for the state to demonstrate before us that evils persist despite the competition which attends the bargaining in this field . . . . Since they [those notions of public policy embedded in earlier decisions] do not find expression in the Constitution, we cannot give them vitality as standards by which the constitutionality of the economic and social programs of the states is to be determined."

This decision lends further support to the new trend of reasoning by the Court which began in 1934 with the Nebbia case. Judicial curbs on legislative action are greatly modified and the old public utility concept is gone.[4]

[1] 313 U. S. 236, 1941.

[2] Nebraska Comp. Stat. 1929, Sec. 48-508.

[3] *Ribnik* v. *McBride*, 277 U. S. 350, 1928.

[4] Cf. also: Horace M. Gray, "The Passing of the Public Utility Concept," *Journal of Land & Public Utility Economics*, February, 1940, p. 8; and Floyd R. Simpson, "Price Regulation and the Public Utility Concept: The Sunshine Anthracite Coal Case," *Journal of Land & Public Utility Economics*, August, 1941, p. 378.

FLOYD R. SIMPSON

School of Business Administration
University of Minnesota

Midwest Power Conference*

PROBLEMS of the power industry during the war dominated the 1942 Midwest Power Conference. Most of the papers presented dealt with technical methods of obtaining maximum power production from various power equipment. A few of the papers, however, were of direct economic significance and are reviewed below.

Keynoting the conference was the address of Leland Olds, Chairman of the Federal Power Commission, on "Power and the War Effort." Mr. Olds first emphasized the need for advance planning of new power installations. As he put it:

"Planning the national electric generating capacity needed for war cannot wait until specific demands for power develop. Of necessity the planning must start by determining the capacity required to serve loads which cannot now be foreseen. This step must be followed by the more difficult task of allowing for industrial expansion, which may readily take unexpected forms . . It is not possible, however, to put into operation electric generating capacity with anything like the speed with which a need for that power may arise. The time required to manufacture and install generating equipment under present conditions precludes any hope of securing more generating capacity in 1942 and 1943 than is now on order and it is even doubtful if this capacity will be available as scheduled."

Mr. Olds described the methods now used by the Commission in determining the "demand to be planned for." He listed the ten most important items of basic information needed to make this estimate. These were:

"1. Complete statistical information on the utilization and supply of electric power by areas for the last 8 or 10 years. This should include power produced by private industrial generation, as well as by public and private utility systems.
"2. Industrial production of each major raw material and intermediate product during the last five years and present and scheduled capacity for each of the next five years.
"3. Reliable estimates for each major raw material and intermediate product for (a) direct war use; (b) indirect war use; and (c) essential civilian use.
"4. Estimates of Federal disbursements for the fabrication of finished goods for each of the next five years.
"5. Reconciliation of estimated quantities of material for direct war use with the fabrication of these materials in the form of finished goods.
"6. Reliable estimates of the wage-earner man-hours required for fabrication of war materials and production of raw and intermediate goods.
"7. Electric power conversion factors of kilowatt-hours per dollar value of product and kilowatt-hours per unit weight or measure for fabricated products, raw materials and intermediate goods.
"8. Maximum probable operating load factors for each industrial group.
"9. Geographic patterns of existing contracts for war materials.
"10. Geographic patterns of Army and Navy establishments presently existing and scheduled for construction during each of the next five years."[1]

Other factors to be considered include: adjustment of data for increased mechanization and electrification of industry (which must be expected with the approach of full employment); similarly complete studies for residential, commercial, and municipal electric services; daily and seasonal load curves for each electric system, including the reasons for the shapes of such curves; and population movements.

The planning of power production to meet war needs begins with these data. The plan, which must arrange for the best allocation of limited generating facilities, must be based on the development of regional resources to the extent necessary to support a given war effort. This means the possible construction of industrial plants in areas heretofore not industrialized but where production can be planned to the national advantage. As Mr. Olds put it:

"The voice of private commercial interest no longer is decisive. As a result, war power planning must fully appraise the potentialities of all areas for development of war industry in terms of power supply which will make possible the placing of industries in presently rural or semi-rural communities."

* This was the fifth annual conference, under the auspices of the Illinois Institute of Technology with the cooperation of nine midwestern state universities and colleges and seven professional engineering societies. It was held at Chicago, April 9-10, 1942. All papers presented to the conference are published in a volume of *Proceedings*. The current volume should be in print about June 1.

[1] Mr. Olds gave full credit to James V. Alfriend, Jr., of the FPC engineering staff, in these words: "I want to pay a deserved tribute to . . . James V. Alfriend, Jr., whose broad conception of power planning has created the pattern which I am about to describe."

Mr. Olds then briefly reviewed the efforts of the Commission to assure an adequate power supply. He also answered the critics of this effort (naming the Edison Electric Institute and its president, Mr. Kellogg), comparing their over-optimistic viewpoint with the later developments which proved them to have been in error. He also elaborated upon the Commission's inclusion of a large number of hydro-electric generating stations in its program to assure an adequate supply of electric energy. In this connection he pointed out that there is no possibility of meeting all the needs of the war program with only the steam generating equipment that will be available. In his opinion, expected difficulties of fuel supply, particularly in the transportation of oil and coal, also make the construction of hydro-electric plants desirable.

Tracing the experience of the Commission during the power shortage in the southeast last year, Mr. Olds sketched some of the Commission's tentative conclusions thus:

"(1) Almost all forms of commercial use of energy contribute to the evening peak, and residential use at the time of evening peak, is generally rising rapidly toward its maximum peak which occurs about 9 o'clock.

"(2) The addition of the second shift and overtime work of hitherto single shift industries adds large loads to utility systems' evening peak loads without requiring additional industrial facilities. . . .

"(3) The combined effects of 'war time' and restrictions upon commercial use, supplemented by restrictions upon industrial use during evening hours only, could reduce the evening peak to the levels of the morning load. This would be accomplished without interfering with the total volume of industrial production and without seriously affecting the habits of the people.

"(4) In some areas there is no need to reduce the evening peak to morning levels because power supply may be from hydro-electric plants having limited amounts of energy available but plenty of capacity.

"(5) Omitting these areas, the aggregate reduction in peak load by measures indicated above would be be at most two and a quarter million kilowatts, of which about 800,000 kilowatts reduction has already been obtained by the institution of 'war time.'

"(6) Further reduction in load would have to be obtained at the expense of uses contributing to the load levels prevailing from 8 a.m. to 8 p.m., involving serious effects upon industrial operations."

Mr. Olds concluded his paper by emphasizing the need to integrate power supply planning with the problem of total war production planning.

Of more than usual interest was a paper presented by C. A. Chayne, Chief Engineer, Buick Motor Division of General Motors Corporation. Mr. Chayne described the installation of electric generators at one of the Buick plants. These generators "feed back" energy into the system of the electric utility from which the motor plant obtains its power and they are powered by aircraft engines during the test runs and "green runs" of the engines.

During the period of operation described by Mr. Chayne the production of energy by aircraft engines on test and green runs has been equal to 68 per cent of the total energy used by the entire plant. This has reduced the amount of energy the Buick plant has had to purchase from the electric utility and has thus added to the total energy available for war production. Mr. Chayne emphasized that the installation of the "feed back" generators was accomplished at less cost than the usual "propeller house" installation made to provide loads for green engines and for engines being tested. The "feed back" generators operate on a staggered schedule so that the periods of operation overlap. This results in a relatively constant output from the installation. Mr. Chayne stated that the local utility had not noticed any appreciable changes in load conditions as a result of the installation.

L. A. Doggett, professor of electrical engineering at Pennsylvania State College, presented a paper on the cost of hydro-electric power in the United States. The paper was concerned with the historical cost of power as developed from the 1938 cost data published by the Federal Power Commission.

HERSCHEL F. JONES
Instructor in Economics
Illinois Institute of Technology

Public Utility Financing in the First Quarter of 1942

PUBLIC utility security offerings totalled $195 millions during the first quarter of 1942 as compared with $177 millions in the fourth quarter of 1941 and $420 millions in the first quarter of 1941. While it is true that the volume of financing during the first full quarter since the United States entered the war is down quite sharply from a year ago it can not be stated with any certainty that public utility financing has been greatly affected by war time conditions. The volume of offerings is usually rather light during the first quarter of the year and the 1942 total exceeds that in the corresponding quarters of both 1938 and 1939.

Long term bonds account for 82% of the first quarter total and nearly all of the remaining 18% is made up of preferred stock issues. Two large common stock offerings by American Telephone and Telegraph Company subsidiaries have been excluded from the totals because the parent company purchased the major portion of the shares.

Long Term Debt Financing. Tables I and II which show the details of publicly and privately sold long-term issues, respectively, indicate that the volume of issues sold directly to institutional investors was relatively light during the quarter, amounting to only $32 millions while public offerings totalled $127 millions. Not since the first quarter of 1939 has the volume of privately sold issues been so small. To date, it appears that if the war has affected the volume of financing, it has had greater influence on the volume of privately sold issues than on those sold publicly.

Analysis of the publicly sold issues listed in Table I shows that offering yields are somewhat higher than in other recent quarters. Only one issue was offered at a price to yield less than 3%. Underwriters' commissions continue at a relatively low level as compared with the customary commissions before the competitive bidding rule of the Securities and Exchange Commission became effective.

The weighted average yield on privately sold long-term bonds issued for the first quarter of 1942 was 3.02%. The largest issue, representing 78% of the entire amount sold privately, was the Commonwealth Edison Company's, first mortgage, 3% bonds maturing in 1977 and sold at 100 to yield 3%. No information on price was available for 3 issues amounting in all to $725,000 or about 2% of the total amount.

Other Utility Financing. Table III lists 4 public utility preferred stock issues offered during the first quarter of 1942. The total

TABLE I. SUMMARY AND ANALYSIS OF PUBLIC UTILITY LONG-TERM DEBT ISSUES OFFERED PUBLICLY, FIRST QUARTER, 1942 *

Company and Issue (A)	Coupon Rate (B) %	Principal Amount (C)	Maturity (D)	Month of Offering (E)	Offering Price (F) %	Offering Yield (G) %	Underwriters' Commissions (H) %	Proceeds to Company (I) %	Estimated Incidental Expenses (J) %	Net Proceeds (K) %	Cost to Company (L)
Alabama Power Co. First Mortgage Co.	3½	$ 80,000,000	1972	Jan.	101.750	3.41	1.350	100.400	.566	99.834	3.51
Iowa Southern Utilities Co. Sinking Fund Debentures	4½	5,000,000	1966	Feb.	100.000	4.50	4.000	96.000	a	a	a
Panhandle Eastern Pipe Line Co. First Mortgage	3	10,000,000	1962	Feb.	100.750	2.95	.730	100.020	1.500	98.520	3.10
Pennsylvania Electric Co. First Mortgage	3⅜	32,500,000	1972	Mar.	103.500	3.19	1.182	102.318	.741[b]	101.577	3.29
Total or weighted average		$127,500,000			102.050	3.36	1.363	100.687	.....	.....	.....
Total or weighted average (Excluding issues for which estimated incidental expenses are not available)		$122,500,000			102.133	3.31	1.255	100.878	.689	100.189	3.42

* Excluding $262 000 of Springfield City Water Company first mortgage 4's of 1956. No information on the offering price of this issue is available.
[a] Not available.
[b] Pro rata share of expenses.

TABLE II. SUMMARY AND ANALYSIS OF PUBLIC UTILITY LONG-TERM DEBT ISSUES OFFERED PRIVATELY, FIRST QUARTER, 1942.

Company and Issue (A)	Coupon Rate (B)	Principal Amount (C)	Maturity Date (D)	Month of (E)	Offering Price (F)	Offering Yield (G)
Bangor Gas Company First Mortgage, Series F	4	$ 300,000	1971	February	a	a
Central New York Pr. Corp. General Mortgage	2⅞	1,000,000	1965	February	$ 97.90	3.00%
Central West Utility Co. First Mortgage, Series F, A	3½	275,000	1957	February	a	a
Kittery Electric Light Co. Unsecured notes	3½	150,000	1966	February	a	a
Commonwealth Edison Company First Mortgage	3	25,000,000	1977	February	100.00	3.00
Southern Natural Gas Co. First Mortgage, Series F	3¼	970,000	1956	February	102.78	3.01
California Water Service Co. First Mortgage B	4	350,000	1961	March	106.50	3.53
Louisville Transmission Corp. First Mortgage, Series F	3⅛	3,850,000	1967	March	100.00	3.13
Total of all issues, Total or Weighted Average (excluding issues for estimated incidental expenses are not available)		$31,895,000 31,170,000			100.09%	3.02%

[a] Information not available.

TABLE III. SUMMARY AND ANALYSIS OF PREFERRED STOCK ISSUES OFFERED, FIRST QUARTER, 1942.

Company and Issue (A)	Dividend (B)	Principal Amount (C)	Month of Offering (D)	Offering Price (E)	Offering Yield (F)
Connecticut Light & Power Company Cum. Pfd. (No par)	$2.20	$11,440,208	January	$ 52.00	4.23%
Panhandle & East. Pipe Line Co. Company					
Pennsylvania Electric Company Cum. Pfd. ($100 par)	5.10%	3,400,000	March	103.75	4.92
Philadelphia Electric Co. Cum. Pfd. ($100 par)	4.40%	4,822,100	March	110.00	4.00
Total or Weighted Average		$34,662,308			4.62%

volume offered was about $35 millions and the weighted average yield 4.62%. This compares with volumes of $52 millions and $6 millions in the first and fourth quarter, respectively, of 1941 and with weighted average yields of 4.54% and 4.88% in the same quarters.

Louisville Gas and Electric Company offered 23,795 shares of its common stock (no par) to the public at $23.50 per share. In addition to this offering the New England Telephone and Telegraph Company offered 222,243 shares of its common stock ($100 par) to its shareholders at par. A similar offering of 656,250 common shares (also $100 par) was made by Pacific Telephone and Telegraph Company. The latter two issues are those mentioned in the first paragraph of this article and, since the offerings were largely absorbed by the parent company, they are not included in our totals.

R. G. DUDLEY
Statistician
Public Service Commission of Wisconsin

W. H. EVANS
Assistant Rate Analyst
Public Service Commission of Wisconsin

Forecasting the Demand for Electric Energy: A Reply

IN the February issue of the *Journal*[1] James E. Gates calls attention to the inadequacy of present methods used to predict electric energy requirements. He makes the flat statement that "the only reasonably successful method unearthed so far has been that of the National Resources Board . . ." In his second paragraph he explains that a "good method" of forecasting could have prevented the "fiasco" resulting from the "shortage" of power in the southeast in 1941. The balance of his article is devoted to describing what he believes to be rational approaches to the problem of forecasting future power production and consumption. His first method involves an analysis of the close correlation existing in the past between the Federal Reserve Board Index of Industrial Production and the production of electric energy. He later refines this by correlating only the sales of electric energy to industrial users with the index. Other suggested methods worked out by Mr. Gates involve the use of sales of energy to the seven industries using the largest blocks of power, and number of users of electric appliances correlated with the average consumption of energy per appliance.

In a previous article entitled "Problems in Administrating War-Time Shortages of Electric Energy," Mr. Gates showed some familiarity with the work of the Federal Power Commission.[2] But in his most recent article he completely ignores the estimates of future power production that have been made by the Commission in cooperation with the major electric utilities in the United States. Since he fails to discuss the methods used by the Commission we may assume that Mr. Gates classes the Commission's efforts as among the "few and unhappy. . . attempts to forecase the demand for electric energy" referred to in his opening remarks.

On this point there is bound to be a difference of opinion. The Federal Power Commission began its experimental forecasting of future power production as early as 1935.[3] In 1939 its present methods of forecasting were developed with special attention to the increases in production that would be necessary for the national defense

[1] J. E. Gates, "Forecasting the Demand for Electric Energy," *The Journal of Land & Public Utility Economics*, February, 1942, pp. 77-81.

[2] J. E. Gates, "Administering War-Time Electric Energy Shortages," *The Journal of Land & Public Utility Economics*, November, 1941, pp. 477-482.

[3] Cf., for example, Federal Power Commission, *National Power urvey, Interim Report*, Power Series No. 1, Washington, Government Printing Office, 1935, especially Chapter IV, "Surplus and Deficit of Dependable Capacity." Among the men who aided in the publication of this report was James V. Alfriend, Jr., of the Power Requirements Division of the survey staff. Mr. Alfriend is one of those principally responsible for the present methods of forecasting used by the Commission.

effort.[4] In general the Commission has used two methods of estimating future power requirements: first, the collecting and combining of forecasts made by individual "Class 1 Electric Utilities;" second, a so-called "kilowatt hour per dollar of battleship" method which involves a detailed study of the early appropriations made by Congress for defense materials. This second method resulted in the development of a standard of electric energy necessary for the production of each individual item of defense material. This standard not only related kilowatt hours to dollar values, but also assigned such kilowatt hours to the particular area or areas where the individual items of material would have to be processed. This method was thus a useful guide to the amount of additional sapacity that would have to be installed in various sections of the country by the individual utilities if the defense effort was to succeed.

In general the Commission has been reluctant to publish its own annual forecasts. For this reason Mr. Gates may be excused for thinking they did not exist. The Commission has, however, published its summary of expected peak loads by areas. These have been published three months in advance in the series of reports entitled "Electric Power Requirements and Supply in the United States."[5] Because of the pressure of time the writer has not made a complete analysis of the accuracy of these estimates but two examples, picked at rannom, seem to indicate that they have been reasonably accurate. In February, 1941, the Commission estimated the peak load in May was 26,198,065 kilowatts; thus the forecast was off less than 1.7 per cent. In June, 1941, the Commission estimated a peak load for September, 1941, of 28,429,723 kilowatts. The actual peak load for September was 28,537,018 kilowatts, so the forecast was off less than .4 per cent.[6]

There is also room for a difference of opinion concerning Mr. Gates' statement that adequate forecasting could have prevented the power shortage in the southeast in 1941 and the ensuing measures which Mr. Gates calls a "fiasco." In his previous article Mr. Gates admitted that this shortage was partially caused by "physical causes beyond control such as unprecedented droughts." The other reason for this "shortage" was the adoption of a policy of the national government that aluminum production should be increased to 100 per cent of available capacity regardless of the consequinces to non-defense users of power. It would be very convenient to have available a method of forecasting that would indicate what the weather would be and what government policy would be in time to make due preparations. Yet it seems a bit doubtful whether a correlation of power production with the Federal Reserve Board Index of Industrial Production could be depended upon to anticipate either changes in weather conditions or changes in national policy. It seems equally doubtful whether an estimate based upon the number of washing machines, refrigerators, and other household appliances would be more successful.

Except for the reference to preventing power "shortages," Mr. Gates does not indicate how his forecast of the future consumption and/or production of electric energy might be useful. Since the end result of his method of forecasting seems to be the number of kilowatt hours that may be produced or consumed annually by the nation as a whole, it obviously could not be used as a basis for planning future installations of generating capacity. Future installations of generating capacity must always be planned on basis of the strategic factor of the peak load expressed in kilowatts, not upon the expected over-all production of electric energy expressed in kilowatt hours. Furthermore, since it is not as yet possible

[4] The first of the current series of reports estimating future power requirements in the United States appeared as of September, 1940. The reports are entitled *Electric Power Requirements and Supply in the United States* and have appeared monthly since the first report was issued, although not with perfect regularity.

[5] *Ibid.*

[6] These figures were obtained by adding the peak load estimates of all power supply areas reported by the Federal Power Commission. There is no reason to suppose that they represent the maximum coincidental peak load of the country for any one month since it is highly probabl that the actual peak occurs in each area at a different time during the month. The purpose of adding the estimates and the actual results for each area was simply to illustrate that on a national basis the Federal Power Commission's estimates have been reasonably accurate.

to transmit electric energy from any one region in the country to all other regions, any estimate of future production or consumption must be broken into specific estimates for individual areas. While Mr. Gates' method of forecasting may be subject to some refinement, it is doubtful whether it could be made useful for the purpose of planning future installations of generating capacity.

Another point that Mr. Gates fails to make clear is the source of his estimate of the future index of industrial production. To make an estimate of power production for 1943, for example, it is first necessary to estimate the Federal Reserve Board Index of Industrial Production for 1943. Now the Index includes the production of electric energy as one of its component parts. Presumably any forecaster attempting to predict the index for 1943 must first predict the production of electric energy for 1943. If he is able to do this, of course, it will be unnecessary to correlate the index with electric energy production in accordance with Mr. Gates' method.

At the risk of being called a hairsplitter, the writer finds it necessary to question Mr. Gates' use of the word "demand." This word has a special meaning in economics that is very different from the meaning implicit in Mr. Gates' article. "Demand" ordinarily means a schedule of amounts that will be taken in a market at a series of prices. This is obviously not what Mr. Gates means when he writes about "forecasting the demand for electric energy." What he does mean, as indicated in his table headings, is the future consumption With most commodities an estimate of the future consumption of that commodity would very likely vary considerably from or the future production of electric energy. an estimate of the future production of the commodity. Electric energy, however, is not stored in large quantities so it is not necessary to criticize Mr. Gates for his failure to diffferentiate between consumption and production. It seems illogical, however, to write about forecasting the "demand" for electric energy without at least making some assumption concerning the rates that will be charged in the future for the energy to be produced and consumed. Mr. Gates leaves us completely in the dark as to what, if any, his assumptions are on this point.

Finally, it should be pointed out that at least for the foreseeable future, Mr. Gates' entire article is super-academic. It must be clear to all, by this time, that the production of electric energy in the near future and for the duration of the war effort will be limited only by our ability to install additional generating capacity on the one hand, and by our ability to improve the plant factor of existing and new capacity on the other. The installed capacity of 41,638,956 kilowatts at the end of 1940 was increased to 44,352,000 kilowatts by the end of 1941. The increase in plant factor for the nation as a whole was from 40.3 per cent to 43.2 per cent.[7] Present prospects are for an increas in capacity in 1942 that will give us a total installed generating capacity of nearly 48,000,000 kilowatts at the end of this year. Assuming a corresponding increase in plant factor, this factor may produce a total of 190 billion kilowatt hours this year. There are those who doubt whether this will be sufficient to meet the growth of war production. If it is not, we will have to ration power for non-war production purposes. This step will be taken when the need arises. No amount of forecasting or estimating at this time can save us from this situation when it develops.

[7] Capacity and plant factor data taken from *Electrical World*, January 24, 1942, pp. 258 *ff*.

HERSCHEL F. JONES
Instructor in Economics
Illinois Institute of Technology

Forecasting the Demand for Electric Energy: A Rejoinder

Mr Jones, in his interesting critique of my article, touches upon some of the weak points, and upon some of the strong points as well. His criticisms fall into six classes, to each of which it seems desirable to devote a paragraph:

(1) *"The estimates of the Federal Power Commission have been ignored, as being one of the few and unhappy attempts to do the job of forecasting."* This statement is true; the sentiment is evidently not shared by Mr. Jones. In his support he musters

some Commission forecasts of 1941, which he says were off 1.7% and .4%, and which he calls very good. When the percentage errors are computed as a percentage of the amount added or subtracted, it will be found to be considerably greater. Consider, for example, the Commission's forecast for December, 1941, made in October, which was 31,736,313 kilowatts. The actual amount was 31,536,310, an error of 200,000 kilowatts, or about .6%, using Mr. Jones' Formula. Consider, however, that anyone should know that the peak demand in December would increase over October, and that the increase is normally, say, 5%. In the Commission's estimates, then, the only problem was how much to add in December over October for the war load. They estimated the total rise at 1,955,000 kilowatts, half of which is certainly attributable to normal peace-time increases, or about 1,000,000 killowatts. The error, then, is 200,000 kilowatts in 955,000, or about 20%, as contracted to .6% arrived at under the other formula. If a similar proportion holds with the February 1941 to May 1941 estimates, the actual error in estimates was about 60%, or maybe even more, or perhaps even in the wrong diriction, i.e., up instead of down. A recomputation of this type would tend to put the Commission's efforts into their true perspective. This viewpoint on the Commission's efforts may not be correct, but it at least has a powerful friend, the President of the United States, who recently put war-time control of power in the hands of the War Production Board, not of the Federal Power Commission.

It is granted that the problem of forecasting is not completely solved by the kilowatt-hour approach, neither is it completely solved by the kilowatt approach. This was fully recognized by Chairman Olds, of the Federal Power Commission, when he said on April 9, 1942, that "in a sense kilowatt hours are a common denominator for the entire war plan," and that "the men at the Front ale almost literally fighting the enemy with kilowatt hours,—kilowatt hours embodied in planes and ships and tanks and guns and high explosives." In his same speech he refers to certain ratios worked out by the Commission, as 66 kilowatt hours per dollar for pig aluminum, 53 kilowatt hours per dollar for magnesium, 30 kilowatt hours per dollar for electrolytic zinc.

(2) *"The Method doesn't forecast weather or government policies."* Wartime regulations forbid the printing of weather forecasts, which accounts for the fact that all forecasts now fail to include provisions for forecasting the weather. This policy is interfering no end with us college professors and arm-chair statisticians, many of whom have devised methods for forecasting the weather. Further, although the President shares my confidence in the methods of the Federal Power Commission, I do not share his confidence in the determination of government policies.

(3) *"The estimates are not useful, because they can't be used as a basis for future planning; such planning must be on the basis of particular areas."* This is certainly the case, and no one could have put the point better than Mr. Jones. It is not fair to say that, "While Mr. Gates' method of forecasting may be subject to some refinement, it is doubtful whether it could be made useful for the purpose of planning future installations of generating capacity." Would it be proper to add Q. E. D. to such a summary statement which contains two conditionals, "may be" and "doubtful whether?"

(4) *"The source of the estimate of future indexes of industrial production is not made clear."* Here is a real, weak point, because if there are no indexes available this type of forecast can't be prepared. It is questionable, however, whether an over-all estimate of the future activity of the steel industry, as well as other industries, is not on the whole, better than one based on a piece-meal estimate of the activities of each area, which is the method used by the Commission. It isn't too difficult to prepare over-all forecasts for most of the larger industries, and such estimates are bting prepared constantly by the war agencies in Washington, and presumably would be available to the forecaster. The fact that the Federal Reserve Board index includes electric power, is directed only at one method used, which method is by far the weaker of those discussed.

(5) *"The word 'demand' has been lifted from its normal context in the field of economics."* There is no alternative but to plead guilty, this having been clearly

done, though there is some question as to how much real violence is done to the concept. Perhaps Mr. Jones would like to hazard a guess as to what would be the effect upon the demand for, or consumption of, energy in the iron and steel or chemical industries, of a rise of 50% in the rate for electric energy. Maybe he would also like to speculate on the effects of a decline of the same proportion? Does he think there'll be any change at all?

(6) *"The entire article is 'super-academic',"* to which charge there is also no answer save guilty. It was known to be academic when it was prepared, and it was assumed that it was being submitted to an academic journal. How many hairs does one have to split to gain the title of "academic?" But why super? Perhaps an academic criticism of a super-academic article might be termed "super-super-academic," this rejoinder "super-super-super-academic," ad infinitum.

It is believed that the methods used in the original article are capable of refinement, so that they will be more useful in doing the actual job ahead. There is no claim that they are in any sense definitive, though by using the same approach, good useable results might be attained.

JAMES E. GATES

Professor of Economics,
Clemson College, South Carolina

Book Review Department

The Economics of Total War. By Henry William Spiegel. New York: D. Appleton-Century Company, 1942. pp. xiv, 410. $3.00.

The design of this book is "total"; it deals with almost every aspect of war economics, here and abroad. Professor Spiegel discusses economic causes of war, manpower requirements, labor relations, control of production and consumption, supplies of strategic materials, food needs and resources, inflation and price control, fiscal policies and wartime international economic relations. A short concluding chapter, "The Aftermath of War," carries the victorious belligerent through the (rather optimistically viewed) transition to peacetime "full employment."

The war studied is also "total", following the Nazi model: "an armed conflict between sovereign states, sponsored and waged by a society in arms . . . Its aim is 'the utter destruction of the vanquished nation and its final and complete disappearance from the stage of history' . . . the line of demarcation which used to divide war and peace belligerents and non-belligerents, is fading away." (p. 37)

The economics, however, is somewhat short of "total". The author wavers between "price economics", "welfare economics", and ruthless "total war economics". The book mirrors the confused and halting evolution of attitude toward war economics in the democratic countries since the war began. Inconsistencies are especially noticeable because of copious quotations from conflicting authorities.

In general, Professor Spiegel arrives at conclusions in accordance with the implications of total warfare. "Direct" controls (priorities, allocation, conversion) are seen to be the keenest weapons for moving resources quickly to arms production, and consumer rationing the most effective method of controlling consumption expenditure and combating inflation. Taxes and loans (forced or voluntary) are shown to affect primarily the *distribution* of the burden of the war, especially in terms of the post-war positions of different economic classes, and to be inadequate for the conversion of the economy to war. (pp. 110, 130 ff)

Certain of Professor Spiegel's generalizations are questionable. Is it true that, " . . . the economic motives of war are not final but are means to further some other end, such as the prestige of the aggressor country and its desire for domination and power" (p. 4), and "If men were motivated exclusively by economic calculation they would not turn to aggressive warfare" (p. 27)? Defending a favorable, or creating a tenable, economic position are certainly ends in themselves. The author deprecates too much the importance of the raw material and market problems of the "have-not" nations, and lays insufficient stress upon the *defensive* nature of economic policies leading to war. The author's contention that "full employment" in the United States would solve the economic problems of South America, even though European markets were closed to her, is likewise of considerable dubiety. (pp. 314-15)

On the more theoretical side, Professor Spiegel is sometimes too doctrinaire. Neglect of the fact that even in its earlier stages not only unemployed resources will be absorbed may lie behind his unqualified advocacy of "inflationary" means of financing an arms program before "full employment" is reached. (p. 126) Prompt restriction of civilian expenditure will certainly accelerate the growth of arms production, albeit with a certain loss of welfare value. "Total war", moreover, does not permit expansion of capital facilities sufficient to constitute an important counter-inflationary force or significantly to ease the consumers' burden (p. 91) Resources are limited and time is short. Conversely, Professor Spiegel neglects the importance of disinvestment in increasing the war potential while easing the current burden upon consumers.

This work lies midway between text and treatise and between "principles" and "practice". Therein consist its peculiar merits and demerits in the fast-growing literature of "war economics". Its theoretical content is greater than any of the other American surveys of World War II vintage, largely because the author has

drawn heavily upon excellent British literature. Descriptive material is copious. The author has done a good job of selection, although its arrangement could be improved. The evolution of the American defense program is set forth adequately. Information concerning the German armament and war effort is more adequate than can be found in other works of similar nature. Both the theoretical and factual content suffer, however, from duplication and imperfect organization.

JAMES S. EARLEY
Associate Professor of Economics
University of Wisconsin

Agricultural Finance. By William G. Murray. Ames, Iowa: Iowa State College Press, pp. 328. $3.25

The book is a textbook for college classes. The first 12 chapters, 135 pages, deal with the principles of farm credit; the last 18 chapters, 178 pages, deal with lending agencies. The subject has, therefore, been cut up into helpings of about 10 pages each. The presentation is clear and simple. The index is excellent. Students should find it a useful introduction to the subject.

The brevity of the treatment, however, permits the presentation of only the elements of the subject. One finds, for example, a brief and simple description of balance-sheet analysis, and a presentation of some of the problems involved in preparing these, but no extended discussion of the problems involved in interpreting them in the extending of credit. There is an interesting reference to the "trend sheet analysys" as developed by the Farm Credit Administration. The chapter on marginal analysis is interesting but does not seem to this reviewer to contain much of use in the actual business of borrowing or lending money.

The notion that "normal values" are not infallible is sound, for they mean "no more than an estimate of what well-informed people think will happen in the future." When used in a routine fashion, the choice of the adjective "well-informed" is questionable. Substituting a rule based on history is chiefly a means of escape from the circumstance, which must be depressing to exact-minded people, that they simply do not know what farm income and value of land will be in the future. The truth is that land values are based on what has happened in the past; the facts of the past are prime determinants in most calculations. But the future—largely unknown—determines whether the valuation is correct. This dilemma can only be resolved by conservatism on the part of those who cannot afford to take risks. Since 1933, loans based on "normal values" have tended toward conservatism.

Murray says rightly: "Down-payment and risk vary inversely." The trick is to know when to take risks. Murray shows that most purchases have been made when income and values were high and farms lost when prices slumped.

Discussion of lending agencies is well-balanced between the private and public agencies. The historical treatment is excellent. The strong and weak points of commercial banks are developed. He does not dodge the basic difficulty to farmers in connection with use of this system as a source of credit: personal and collateral loans to farmers shrank from $2,944 million in 1924 to $594 million in 1937.

Murray presents the common arguments against the requirement for stock ownership by borrowers in the federal land bank system. He draws an analogy with farmers' mutual insurance companies. The situations are fundamentally different. A mutual insurance company does not need capital; a land bank does in order to establish a basis for borrowing the funds it must have to make loans to farmers. The fact should be frankly faced: either the federal land bank system must have adequate invested capital or government guarantees. If a system based on federal guarantees is desired, we should adopt it but we should not disguise it as a cooperative by some membership arrangement. This reviewer agrees with Murray that more definite benefit should accrue to the well-run local farm loan association, but he does not agree that elimination of stock investments is essential to this end.

In connection with the federal intermediate credit banks, Murray objects to the use of the terms "discounts" or "rediscounts" in connection with advances made by the federal intermediate credit banks. He states that those banks do not discount notes submitted to them. As a matter of fact in the

early days of the operation of these banks, they handled production paper on a strict discount basis, and the credit corporations operated in a similar manner. In fact, some of the credit corporations which obtain funds from these banks still discount and the banks in turn discount their notes.

Murray points out correctly and fairly the differences in the position of the production credit association in the South and West; in the former, small loans for short periods create the necessity for continued subsidy; in the latter, large loans for longer periods provide the basis for profitable operation. His statement that the purchase of stock by borrowers in these associations in proportion to the amounts borrowed is not in harmony with cooperative practice or philosophy, is simply not true. Cooperation implies that burdens should be distributed according to benefits. The chief burden in a credit cooperative is to underwrite risk so that someone will advance money for loans. No fairer or more equitable way of doing this can be devised than requiring each borrower to buy stock in proportion to his use of the association. Whether this stock is bought in a lump sum or by annual installments is of no fundamental importance. If it is argued that 5 percent of the amount borrowed is not enough to underwrite risks, the argument might be valid, but to argue that annual deductions or installment purchase are more cooperative than outright purchase of stock is simply nonsense. The author is correct in saying that the associations are handicapped in relation to rural banks by not being as convenient and by not handling deposits and furnishing checking service, or for strictly short-term loans. Whether the associations survive in competition with country banks, where the latter are available and have adequate funds to service farmers, depends on whether the associations can furnish a credit service more adapted to farmers' needs than the banks are willing to offer.

In the concluding chapter on governmental farm credit and tenancy, Professor Murray concludes, after a detailed account of the history of numerous efforts in this field, that "the prospects of governmental farm credit reducing tenancy seem none too bright." He emphasizes the fact that fluctuations in price levels make farm ownership hazardous for many people. Students of land policy and farm tenancy may well ponder the basic fundamental truths. The ownership of land (or other property) with a high debt is a hazardous proposition. Thousands of farm operators know this, even if the present generation of agricultural policy makers refuse to recognize it. Professor Murray is to be commended for being strictly realistic about it. In fact no one could write a sound book on farm finance without real insight into the hard facts about the risks entailed in land ownership.

L. J. NORTON

University of Illinois

Our Landed Heritage: The Public Domain, 1776-1936. By Roy M. Robbins. Princeton, New Jersey: Princeton University Press, 1942. pp. x, 450. $5.00.

During recent years lists of non-fiction seem to be carrying an increasing number of books written about important, interesting, and picturesque aspects or individuals in the earlier American scene. Some of these books have shed light upon events, developments, and characters that go a long way toward increasing our understanding and appreciation of facts and phases of American history hitherto little known, and in some cases correcting erroneous impressions drawn from too general interpretations. They have the added virtue of presenting a more human side of America's evolution—of putting meat on the skeleton of mere chronological description.

In similar vein, much scholarly research into fundamental and vital aspects of American economic, social and political evolution is being presented in highly readable form. Professor Robbins' book belongs in this category. It would make a very usable text for a course in Land Policies while at the same time it is a very digestible and palatable presentation of economic, historical, and political facts for the layman who is interested in "our landed heritage." The readability of the book comes from the "synthetic" approach, for the text describes not land policies alone but land policies related to other economic phenomena, influencing them and in turn being influenced by them.

The time was ripe for a book such as this. Nothing at all comparable has been avail-

able since Professor Hibbard's *A History of American Land Policies,* and much water has gone over the dam since 1924. Another aspect of its timeliness is the fact that the evolution of the American public domain may be said to have completed one full life cycle—from sparse settlement to virtually complete absorption. Now a public domain is once more emerging in the form of reserves set aside for grazing, forestry, parks, etc., and is being further augmented by lands which are reverting to public ownership as a result of tax delinquency and will thus be available for planned and regulated utilization in the public interest.

This reviewer seems not to be in a critical mood. Only one negative comment comes to the fore. The book would have benefited by the inclusion of more and better maps. These would have aided the reader in visualizing not only the location of some of the major developments described, but also their magnitude.

HELEN C. MONCHOW
Assistant Professor of Economics, Northwestern University

The Reorganization of Railroad Corporations. By William H. Moore. Washington, D. C.: American Council on Public Affairs, 1941. pp. 171. $3.00.

This excellent monograph on an important current problem constitutes a critical review of railroad reorganization under Sec. 77 of the Bankruptcy Act of 1933 and subsequent amendments. A preliminary chapter outlines the weaknesses of reorganization procedures prior to 1933. The steps under the new set-up are reviewed with a suitable sprinkling of illustrative material.

The volume is noted for its persistent emphasis on the source of value: future earnings. This makes the author critical not only of the excessive preoccupation by those concerned with reorganization, with past costs and costs of reproduction, but also of the entire fair return procedure. Evidently his sympathies lie with views expressed earlier by Hadley, Cabot, and others on this problem. The allowance of a fair return encourages thin equities and excessive financing with bonds, which in turn accentuates the probabilities of bankruptcy. Thus of the 18 Class I lines in reorganization from 1920 to 1933, 7 are again in reorganization; and of 7 more, some were probably saved from this fate through absorption by stronger roads. If the author's advice had been followed earlier, these tragedies might have been averted.

The author makes an admirable defense of income bonds and questions the use of mortgage bonds with their involved indentures and legal documents. What is the purpose of all this alleged protection when the security behind the bonds is not the property but the earning power of the company? Not all readers will share the author's skepticism of sinking fund requirements for new bond issues. His condemnation of the commission's parsimonius attitude toward working capital includable in the rate base and of basing earnings forecasts on "averages" of the past 10 or 15 years for reorganization purposes are worth noting.

Because of its title the volume is likely to receive less attention by students of regulation than it merits. Able seniors and graduate students should have it drawn to their attention, not primarily to have them understand reorganization and Sec. 77, but to have them see what is wrong with our present system of utility control.

It deserves wide study by regulatory authorities, judges, lawyers and students of both corporation finance and utility regulation. The author combines scholarship in law, finance and economics, with maturity and wisdom. This is the type of analysis which, if widely understood and followed, would make a difference in our relations of government and business. Unfortunately this is marred somewhat by lack of care in proofreading, footnote numbering, and by too brief an index.

EMERSON P. SCHMIDT
University of Minnesota

Metropolitan Government. By Victor Jones. Chicago: The University of Chicago Press, 1942. pp. xxiv, 364, maps, charts. $4.00.

In his brief introduction to this study, Charles Merriam remarks with characteristic indomitable hope that "Local self-government, we may be sure, is not dying but is going through a revolutionary transformation in which local values will appear in a new light, in a newer and finer setting

than before." The outstanding importance of the metropolitan districts of the country in the problem of local self-government in the present century is due both to the fact that nearly one half of our population is in 140 urban areas (those with populations of at least 100,000) and the extent to which the life of these communities is and will be more decisive in our economy and our culture generally. A few historians have even begun to challenge interpretations and lines of research in American history that have hitherto accepted somewhat uncritically the attitudes developed in rural society.

Mr. Jones' book will be useful to students of government because it contains accounts of most of the basic aspects of the problems of government in metropolitan areas in this country. He began it while a research assistant of the Social Science Research Committee of the University of Chicago and continued it while at the Bureau of Public Administration of the University of California. Students of land use and utility problems should have this book available for the useful introduction to such central questions as: the problems of government that have developed with the rise of metropolitan areas, and the proposed solutions (divided by the author into those "involving no structural changes" and those "with structural changes"); structural, fiscal, and legal aspects of integration; and the politics of integration. These chapters—the heart of the book—are generously supplied with guides to special studies of particular areas or functional problems. The author's conclusion (p. 337) that "the politics of integration are the most significant aspects of the problem" will be accepted by all who follow his careful account of the frustrations that mark the history of the efforts to achieve any large scale and general solution. His remarks on rural attitudes that dominate state legislatures and suburban attitudes that are powerfully entrenched in the metropolitan districts, and his analysis of clashes of interest over taxation and expenditure lead to the conclusion that change will be achieved only with great difficulty. The author's suggestions concerning more effective presentation of the case for reform are brief and general, since it is only when a specific situation is analyzed that varied and concrete proposals can be made usefully. One may suggest that the need for urban reconstruction in the post-war period in order to provide employment may force increased attention to the problem, and the author, in any new edition, might usefully include an account of the policies of national agencies dealing with municipalities and reflecting metropolitan problems, such as the P. W. A., the F. H. A., the U. S. H. A., the National Resources Planning Board, and the Bureau of Public Roads. Apparently the English cities are being forced by the necessity of defense against, and repairing the consequences of bombing to tackle some of the elements of the problem, and more extensive changes are discussed there for post-war reorganization. An immensely useful task can be performed by the scholar who will prepare himself not only from the study of documents but by tramping the streets and mixing in the life of neighborhoods in his own metropolitan community. He can try to define what that metropolis is in terms of core function as well as outlying physical and spiritual periphery, and to devise ways of communicating this unity to a mass of people who not only do not think for themselves as a community but deliberatly reject doing so. For all such scholars, this book will be a useful point of reference.

JOHN M. GAUS
University of Wisconsin

Air Transportation. By Claude E. Puffer. Philadelphia: The Blakeston Company, 1941. pp. viii, 651. $3.75.

In this book an attempt is made to cover the whole field of commercial air transportation and give the reader and student a complete picture of the economic and legal aspects of the service. Regulation by the government in all of its various phases is discussed in detail. The economic characteristics of the industry, the rates in effect for the carriage of persons, property and mail are analyzed and special attention is paid to the subsidy factor.

The law pertaining to civil aviation is still in a state of development; however, scheduled air transportation companies are definitely classed as common carriers and must live up to the duties and liabilities attached to the common carrier industries. As an indication of the youth of the in-

dustry, it is observed that all of the legal cases cited on the subjects of common carrier status and liability for damages are decisions of lower courts: the United States Supreme Court has not yet been called upon to decide fundamental issues.

The provisions of the Civil Aeronautics Act are in general looked upon with favor by the author—he regards the legislation as wise and forward looking in spite of the fact that there is no provision for a coordination of the regulation of air transportation with that of other types of carriers which come under the jurisdiction of Congress. He points out the possibility that the officials who are administering the act may become too "air minded" just as the members of the Interstate Commerce Commission have been accused of being too "rail minded." That part of the act which gives control over the construction and maintenance of airways and over the enforcement of safety regulations to the Department of Commerce the author deprecates because of the Department's unsatisfactory record of administering these provisions when it had that power under the 1926 Act.

The general principle underlying the provision that the inauguration or extension of services require certificates of public convenience and necessity is also approved because of the resultant waste from unnecessary duplication of facilities. The problem of selecting one of several applicants for a given route is not always easy. The Civil Aeronautics Authority feels the necessity for a sound and well coordinated net-work of air transportation lines and to that end it makes its decisions and selections, using as tests the experience of operators, their financial responsibility and their operating plans.

In the field of air-mail service, Congress has established the policy to be administered by the Civil Aeronautics Board of basing the compensation for the carriage of mail upon the need of each individual carrier. A change is urged in this policy: a system of mail payments is advocated based upon costs. A revision of the system of accounts could be made so as to assist in cost determinations. It is suggested that a lower rate than the present six cents per ounce would result in additional volume of mail and make the service more profitable to the Post Office Department.

The Civil Aeronautics Act of 1938 provides for federal regulation of rates for the transportation by airplane of persons and property—the charges of each carrier must be just and reasonable, and there must be no discrimination with respect to person, place, or type of traffic. The rate-making rule is patterened after that now contained in the Interstate Commerce Act. One of the problems of the Board is to fix rates levels in such a manner that the carriers will be less dependent upon public aid. Sufficient time has not elapsed to give the Board much experience in actual rate making. The industry is still young and a certain amount of rate experimentation is necessary in order to determine what the traffic will bear. The author criticizes the Act because it does not provide for the regulation of security issues by the Board: that is left in the hands of the Securities and Exchange Commission. It is feared that companies may build up security structures which would impede sound regulation. The author agrees with the conclusions reached by many students of the problem that the division of the powers of enforcement of safety rules between the Aeronautics Authority and the Administrator who is an official of the Department of Commerce is unwise.

The publicly owned airports show an investment of about $200,000,000: about $140,000,000 of these expenditures come out of funds provided by the federal government by various federal agencies during the period since 1933. It appears tht local communities are shifting the responsibility of air port development to the federal government. In order for the industry to exist it is necessary that the government bear these terminal burdens because the carriers are not in financial condition to do so.

The value of the book is enhanced by a well selected bibliography and detailed index. It serves both as a text and as a handbook of valuable information in the field of air transportation.

HENRY R. TRUMBOWER

University of Wisconsin

Statistical Methods Applied to Agricultural Economics. By Frank A. Pearson and Kenneth R. Bennett. New York: John

Wiley & Sons, Inc., 1942. vii, 443 pp. $4.00.

This book indicates a healthy departure from the trend established by most new books and new editions of old texts in the field of statistical methods. More emphasis is placed on techniques and precautions of tabular analysis than in any other text published during the last decade and a half. When it is realized that by far the greater proportion of statistical analyses start and stop by comparing one column of figures with another, the importance of this approach is evident. Four chapters specifically dealing with this technique are "Tabular Analyses of Relationship," "Tabulation vs. Correlation Analysis," "Application of Standard Errors to Tabular Analyses," and "Application of Analyses of Variance to Tabular Analysis."

To leave the impression that the volume is concerned only with tabular analysis would be erroneous. Slightly less than one-third of the book is required to cover frequency distributions, averages, dispersion, index numbers, and time series analysis. An introduction to tabular analysis logically precedes the beginning chapter on "Correlation." Then follows multiple, partial, curvilinear, and joint correlation. The analysis of "Variance," "Chi square," and "Reliability of Correlation Analysis" are chapters which conclude the formal discussion. A glossary of symbols, a method of calculating sums of squares and sums of products with tabulating equipment, and an illustration of the Doolittle method for solving normal equations are included in appendix.

A definite plan of development for each chapter has been followed throughout the book: first an explanation of the technique introduced, then a detailed arithmetical illustration, and finally a discussion and criticism of *uses* of the method. The result is plainly one that will be welcomed by teachers. Practically all formulas are given in words as well as symbols. Even a mediocre student should be able to find his way through the calculations, and go a long way toward correct interpretation of the results.

The inclusion in the title of the reference to applications to agricultural economics may be slightly misleading. In most cases agricultural data are used as the basis for illustrations, but very little of the technique is exclusively agricultural. For example, there is no detailed statistical discussion of the agricultural parity price problem. On the other hand graphic methods and collection of data are omitted. Considered as a unit the book represents a job well done. It is certainly worthy of consideration for courses in other fields as well as to serve as a handbook for the practising statistician who wishes to have procedures involving more recent developments at his arm's length.

ERWIN A. GAUMNITZ
University of Wisconsin.

Economic History of Europe, 1760-1939. By Ernest L. Bogart. New York: Longmans, Green & Co., 1942. pp. 734. $4.50.

Ernest L. Bogart is an economist who has been writing on Economic History for a long time. His *Economic History of the United States* was a pioneer and widely used work in that field. Now he has ventured into the field of European Economic History.

The title of his new work is a little misleading. It is not an economic history of the whole European continent. It is rather "a narrative and chronological account of the major economic activities of Britain, France, and Germany" during the years 1760 to 1939 "with a side glance at Russia and Italy." Within these limits the author has tried to give a functional account of economic institutions and to explain the consequent changes in the economic activities and structure of society. The work must be judged in the light of what the author tried to do.

In his efforts to fulfill his aims the author has followed a rather obvious plan. He has subdivided the nearly two centuries of time covered by the book into three periods: 1760-1870, 1870-1914, and 1914-1939. He designates the three periods as "The Rise of the Machine," "Economic Rivalries," and "Economic and Political Revolution." Each of the three sections then has chapters on agriculture, industry, commerce and commercial policy, transportation, money banking, and finance, labor and the labor movement, and population and welfare. The last section adds a chapter on new forms of economic organization, which contains the "side glance" at Russia and Italy.

The book is evidently the product of a lifetime of scholarly reading. Both the bibliographies and the text give the reader this impression. The bibliographies are discriminating, however, rather than all inclusive. The text is packed with information. Like most works of reference the book under review is uneven in performance. This may be illustrated by the first chapter on transportation. There are sections on roads, canals, railways, and communication for England, France, and Germany. In the main, the various sections are good but some of them could very easily be improved. One wonders why the author said nothing about the development of the optical telegraph in the three countries and omitted at least reference to some of the rivals of Morse. One is inclined to ask why so much of the interesting story of the development of the Post Office in both France and Germany was left ont. One is unable to see why there is a section on the development of German ocean shipping and nothing on French or English ocean shipping. The other chapters have similar omissions. The book has very few maps and the index is inadequate.

C. P. HIGBY

University of Wisconsin

Public Utility Economics. By C. Woody Thompson and Wendell R. Smith. New York: McGraw-Hill Publishing Company, 1941. $4.50.

This volume is designed for college courses, but, as stated in the preface (p.v), it will be useful for others interested in the subject.

Every phase of regulation is analysed, including chapters on pre-commission regulation, state regulation, valuation, depreciation, fair rate of return, adequate service, security issues and holding companies. Preceding the chapters covering the problems of regulation is a section dealing with fundamental questions of scope, definition and economic characteristics of public utilities. Included in this section are rather sketchy chapters concerned with the origin and historical development of the various types of utilities. They are primarily descriptive, and could have been further condensed into a single chapter or omitted entirely without detracting from the merits of the book. Much of the material presented here duplicates that given in courses of economic principles and economic history of the United States. Rather than so much descriptive material, greater emphasis might have been given to a more complete analysis of federal regulation. So far as public utility regulation is concerned, the "pattern" (p.vi) of federal regulation is now sufficiently well developed to warrant thorough treatment. Two adequate chapters are found of the problems of differential rates and of rate structures, which are of fundamental importance to public utility management and to regulatory authorities.

The final section deals with special problems of taxation, marketing of utility services, decline of street railways and public ownership. Two brief chapters devoted to the federal power projects will be useful as summaries of recent events in the respective fields. Except for the chapter on the Tennessee Valley Authority the approach here is essentially descriptive. Students would be benefited by a greater use of economic analysis at relevant points, such as the authors have injected in some other parts of the book.

One of the controversial questions of regulation, namely, the definition of a public utility, receives a new and broadened meaning. The authors have concluded that the economic characteristics of public utilities are (1) necessity, and (2) inadequate competition. While the phase inadequate competition is merely a shift from the monopoly criterion, the reviewer feels it is so broad that it would include *all* types of business now conceived as being in the twilight zone.

The chapters on valuation give the arguments for and against historical cost and cost of reproduction and describes adequately the methods of rate-base determination of the past and those now in vogue. Though recognizing the difficulties of appraising results, the authors do not hesitate to state their conclusions. Nonetheless, students and even teachers may leave their reading of this section in a quandry as to which method of valuation the authors really prefer.

Each chapter closes with a summary or resume as well as a selected and descriptive list of references which is most convenient

and helpful to students.

A wealth of valuable material and sober comment is presented in this book, which is well worth the attention of every student of public utility regulation. An attitude of general objectivity and scrupulous respect for facts is amply evidenced, but the style is marred by an excessive use of direct quotations.

LIONEL W. THATCHER

Board of Investigation and Research
Washington, D. C.

The Theory of Incidence of Sales Taxation. By John F. Due. Morningside Heights, New York: King's Crown Press, 1942. $2.25 (planographed).

In a foreword Professor Carl Shoup tells us that this is an experiment by Columbia University in low-cost publication. This volume is intended to fill the gap between existing theories of tax incidence and the facts of the real world.

The gap exists, presumably, because the existing theories posit either pure competition or pure monopoly. This study, on the contrary, analyzes tax incidence under the assumptions of monopolistic competition. As such it is essentially a restatement of the theory of the individual firm with special application to sales taxation. These applications are presented subject to numerous modifications.

As such this study is to be contrasted with the historical theories by its abstractness. Historically, theories of tax incidence made an attempt to say who bore the taxes. This study, like recent price theory, merely states the various conditions under which a tax is borne by different persons or groups.

The analysis is made here in terms of the short, the transitional, and the long periods under conditions of constant, decreasing and increasing costs. The results are in accordance with the traditional doctrine for the industry as a whole, although the author (p. 16) seems to believe that the emphasis upon the individual firm would give "greater precision."

The difficulties presented by this type of abstract analysis are shown in Chapter II dealing with the incidence under pure competition. In the short run the author concludes that the tax can be shifted forward only if supply is reduced, and under "pure competition" this must come about by the closing down of firms which can no longer cover average variable cost. In the period of readjustment, "if all factors were equally immobile" (which they are not) the reward of each would be reduced in a like manner. But in practice they are not equally mobile, contractual rights and bargaining power are unequal, and hence those bear the tax "who are unable to pass it off to others." In the long run the incidence is determined by the exodus of firms, the willingness of new firms to enter the industry, new capital investment to be made, etc.

But which factors are immobile? Which have a superior position? Which will shift the tax? Labor, capital entrepreneurs, stockholders? This the author does not try to say. His is an essay in pure theory which lays down the different conditions under which one group or another bears the tax. As such it leaves us pretty much as we were before. We have new tools but few applications. Appendices to Chapters IV and VII refer to empirical studies of tax incidence, but it is not clear that these studies use the tools previously presented.

This publication should nevertheless serve as a guide to those interested in studying the theory of incidence from the vantage point of recent imperfect competition theories. It presents an interesting group of hypotheses even if it does not actually give us general answers about the burden of taxation. If anything, it shows that no general answer is possible.

WALTER A. MORTON

University of Wisconsin

Latin America. By Preston E. James. New York: The Odyssey Press, 1942. pp. xx, 908, maps, lls., bibliogr., index. $4.50.

The author, a distinguished scholar of Latin-American affairs, has done an outstanding service for the English-speaking world by making available in compact, readily accessible form the fruit of twenty or more years of study and penetrating insight. If understanding may lead to improvement in inter-American relations, then this book should make us more appreciative of the diversity of the Latin-American scene, of problems of land tenure, race, culture, tropical disease, high-altitude living, malnutrition, of strength and weakness, hopes, disappointments, and prospects for this con-

tinental area. It is a pleasure to recommend this book, without qualification, to all serious students of Latin America.

The author achieves coherence and comprehensiveness by utilizing a systematic exposition and analysis which, with variations to fit local conditions, employs an approach well illustrated by the treatment of Brazil. An introduction covering the land and people is divided into the subjects of surface features, climates, natural vegetation, mineral resources, early racial ingredients, the course of settlement (related to sugar, gold, coffee, and other tropical products), and the character of immigration. This is followed by five regional chapters using a similar approach but in greater detail. Finally, "Brazil as a Political Unit" serves as a poignant summary chapter.

For the geographic-minded, pleasure and profit are afforded by an excellent series of maps for each region discussed. These maps make ready comparisons possible. They show surface configuration with underlying rock structure, natural vegetation, land-use regions, and population distribution by dots. Although publication necessitated cutting these fine maps into smaller than page-size regional fragments, this fault will soon be rectified by the publication of wall maps. Further, a statistical table is presented on the first page of each portion treating a separate country. This table makes possible such useful inter-Latin-American comparisons as the per capita dollar value of imports and exports and railroad mileage.

It is the author's analytical penetration into basic Latin-American conditions which renders his contribution so outstanding. The deep insight of this book raises it entirely from the ranks of those dry texts which gall the reader with summaries of inadequate secondary source material and muddy synthetic conclusions. Excellent but random examples of the author's understanding are afforded by statements, too long to quote here, showing: the relation of the pastoral native Argentinean and the tenant farmer immigrant to the rise of agriculture in the Humid Pampa; the struggle of the Ecuadorian with remoteness and poverty of resources; the meeting and mixing of Spanish and Inca Indian cultures in Peru without amalgamation into a coherent society; and the health and population problems of Puerto Rico.

Comprehensive coverage is provided in an outstanding manner not only for South America but for Middle America heretofore a geographic "No Man's Land." Finally, the book possesses a most complete comprehensive bibliography, climatic data for 115 stations, commodity statistics enumerating the productive participation of each country, and a most useful two-page guide to the pronunciation of Spanish and Portuguese place names.

MALCOLM J. PROUDFOOT
Census Bureau

Books Received

An Examination of Basic Principles of Comparative Forest Valuation. By Roy B. Thompson. Duke University of Forestry, Bulletin 6. Durham, North Carolina, January, 1942. pp. 99. 75c.

Farm Management and Marketing. By V. B. Hart, M. C. Bond, and L. C. Cunningham. New York: John Wiley & Sons, Inc., 1942. pp. 647. $2.75.

Financing the War. By Tax Institute Symposium. Philadelphia: Tax Institute, 1942. pp. 357. $2.50.

Forty-Four Cities in the City of Chicago. Chicago: The Chicago Plan Commission, April, 1942. pp. 98.

Latin America. By Preston E. James. New York: The Odyssey Press, 1942. pp. xx, 908, maps, ills., biblogr., index. $4.50.

The Rehabilitation of Southwest Washington As a War Housing Measure. By Arthur Goodwille. Washington, D. C.: Home Owners' Loan Corporation, 1942. pp. 39 (mimeo.).

Social Goals and Economic Institutions. By Frank D. Graham. Princeton, N. J.: Princeton University Press, 1942. pp. 273. $3.00.

The Theory of Incidence of Sales Taxation. By John F. Due. Morningside Heights, N. Y.: King's Crown Press, 1942. $2.25. (Planographed.)

Farm-Mortgage Credit Facilities in the United States. Washington, D. C.: U. S. Department of Agriculture, Miscellaneous Publication, No. 478. 1942. pp. 262. 55c.

Financing Government in Michigan. By Robert S. Ford and Albert Waxman. Michigan Governmental Studies, No. 9. Ann Arbor: University of Michigan Press, 1942. pp. 213. $1.00.

The Editor's Page

SOME thought-provoking letters have come in since the publication of the February issue of *The Journal.* Among them is one from an eighty-two-year-old man who makes no claim to academic knowledge of economics, either land economics or public utilities. He wrote:

"I read your *Journal* with interest and almost from cover to cover, as I sat here by my window and rocked. It strikes me that your group are sparked with a new slogan—'Use.' I seem to recall the era when everyone preached 'save'; and then it was 'spend'; but now along comes this grand word 'use', and 'utilize' and 'utilities'. I see these words running all through the pages of the magazine. As my grandchildren would say, 'You've got something there, brother!' Good luck and good use to you all."

Submission of Manuscripts

The Journal exists to provide a medium for the dissemination of knowledge, the exchange of men's findings in their search after truth. It limits its scope of interest to two broad fields of economics—land economics and public utilities. Readers everywhere who may have a contribution to make in either of these fields are encouraged to submit their writings to the Editorial Board. All manuscripts submitted are read by at least two members of the Board, on whom rests the ultimate responsibility for their acceptance or rejection. Authors do not receive payment for their articles. But the writer of each major article receives one hundred reprints of his article gratis. The writer of each departmental article, if he is not already a subscriber to *The Journal,* receives a copy of the issue in which his contribution appears.

Financial Support

The Journal, like most scientific publications, is not at present self-supporting. Its budget is subsidized to a limited extent by the University of Wisconsin. Within recent weeks, some financial gifts have been made to the University to aid in the publication of *The Journal* through this difficult period when the war is diverting the efforts of scholars and administrators alike to the immediate tasks of the government. These donors look upon *The Journal* as an educational project which has won recognition and is worthy of their support.

Subscription Status

It is noted with satisfaction that there has been no appreciable falling off or cancellation of subscriptions because of war-time conditions and circumstances although such situations might reasonably be expected to occur. On the contrary, new subscriptions have come in from Mexico and the South American countries. Delivery to belligerent countries has been stopped; and naturally enough, no new subscriptions, or renewals on lapsed subscriptions have come in from those countries. However, requests have been received through libraries and agencies that a number of copies, equivalent to the number formerly on the subscription list to those countries, be held in our storerooms against future delivery.

It Happens in War Time

The war is bringing changes to subscribers, contributors and Board members. One member of the Editorial Council is on duty somewhere outside of the continental United States; at least three contributors to this issue of *The Journal* received orders for induction into the armed forces since the day their manuscripts were released to the printer; and the mails continually bring notice of change of address both from subscribers and from contributors. The war-time duties of our contributors are adding richly to the value of their writings and are bringing to *The Journal* readers up-to-the-minute developments which are taking place in the war-time economy.